

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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**In re Application of:** **PHILYAW, Jeffry Jovan**

**Application Serial No.:** **09/382,423**      **Confirmation No.:** **5217**

**Filing Date:** **August 24, 1999**

**Group:** **2623**

**Examiner:** **BROWN, Rueben M.**

**Title:** **METHOD AND APPARATUS FOR UTILIZING AN AUDIBLE SIGNAL TO INDUCE A USER TO SELECT AN E-COMMERCE FUNCTION**

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**BRIEF ON APPEAL**

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## TABLE OF CONTENTS

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<b>I.</b>	REAL PARTY IN INTEREST .....	1
<b>II.</b>	RELATED APPEALS AND INTERFERENCES.....	1
<b>III.</b>	STATUS OF CLAIMS .....	3
<b>IV.</b>	STATUS OF AMENDMENTS .....	3
<b>V.</b>	SUMMARY OF CLAIMED SUBJECT MATTER .....	3
<b>VI.</b>	GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL .....	5
<b>VII.</b>	ARGUMENT.....	6
<b>A.</b>	Rejections under 35 U.S.C. §103.....	6
<b>B.</b>	Recent Decisions Affecting a Finding of Obviousness. ....	7
	<i>In re Kahn</i> .....	7
	KSR.....	13
<b>C.</b>	35 U.S.C. § 103 Rejection .....	15
	1. Independent Claim 1 as rejected by the combination of <i>Kitsukawa</i> and <i>Yuen</i> .....	16
	2. The Cited References – Teaching/Suggestion/Motivation Test. ....	17
	a. Discussion of <i>Kitsukawa</i> .....	17
	b. The <i>Yuen</i> Reference .....	26
	3. Conclusion - TSM Test.....	30
	4. KSR Test.....	32
	5. Dependent Claims 4, 5, 7, 9 and 11 as rejected by the combination of <i>Kitsukawa</i> , <i>Yuen</i> and <i>Marsh</i> .....	33
	a. Discussion of the <i>Marsh</i> reference.....	34
	6. Conclusion - TSM Test.....	38
	7. KSR Test.....	39
	8. Dependent Claims 2, 8, and 10 as rejected by the combination of <i>Kitsukawa</i> and <i>Yuen</i> .....	40
<b>VIII.</b>	Conclusion .....	41
<b>Appendices:</b>		
<b>A.</b>	U.S. Patent No. 6,282,713	
<b>B.</b>	U.S. Patent No. 6,668,133	
<b>C.</b>	U.S. Patent No. 5,848,397	
<b>D.</b>	Response dated April 4, 2007 to Final Office Action mailed October 5, 2006	
<b>E.</b>	<i>Alza Corporation v. Mylan Laboratories, Inc.</i> , 464 F.3d 1286 (Fed. Cir. 2006)	

- F. *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57 (1969)
- G. *Cable Elec. Prods., Inc. v. Genmart, Inc.*, 77 F.2d, 1015 (Fed. Cir. 1985)
- H. *Cross Medical Products, Inc. v. Metronics Sofamore Danek, Inc.*, 424 F.3d 1293, 1323 (Fed. Cir. 2005)
- I. *Dann v. Johnston*, 425 U.S. at 219, 226, 96 S.Ct. 1393, 47 L.Ed 2d 692 (1976)
- J. *In re Bond*, 910 F.2d, 831, (Fed. Cir. 1990)
- K. *In re Clinton*, 527 F.2d 1226 (C.C.P.A. 1976)
- L. *In re Dembicza*, 175 F.3d 994, 998 (Fed. Cir. 1999)
- M. *In re Hiraro*, 535 F.2d, 67, (C.C.P.A. 1966)
- N. *In re Kahn*, 441 F.3d 977, 985 (Fed. Cir. 2006)
- O. *In re Regel*, 526 F.2d, 1399 (C.C.P.A. 1975)
- P. *In re Rouffett*, 149 F.3d 1350, 1357
- Q. *In re Yamamoto*, 740 F.2d 1569, 1571 (Fed. Cir. 1984)
- R. *KS* International Co. v. Teleflex Inc. et al., 127 S. Ct. 1727 (2007)
- S. *Medichem S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir 2006)
- T. *Sakraida v. AGPro, Inc.*, 425 U.S. 273 (1976)
- U. *United States v. Adams*, 383 U.S. 39, 40 (1966)

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## TABLE OF AUTHORITIES

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**Cases**

<i>Alza Corporation v. Mylan Laboratories, Inc.</i> ,	15, 17
464 F.3d 1286 (Fed. Cir. 2006).....	15, 17
<i>Anderson's-Black Rock, Inc. v. Pavement Salvage Co.</i> ,	18
396 U.S. 57 (1969).....	18
<i>Table Elec. Prods., Inc. v. Genmart, Inc.</i> ,	14
77 F.2d, 1015 (Fed. Cir. 1985).....	14
<i>Cross Medical Products, Inc. v. Metronics Sofamore Danek, Inc.</i> ,	15
424 F.3d 1293, 1323 (Fed. Cir. 2005).....	15
<i>Dann v. Johnston</i> ,	13
425 U.S. at 219, 226, 96 S.Ct. 1393, 47 L.Ed 2d 692 (1976).....	13
<i>In re Bond</i> ,	
910 F.2d, 831, (Fed. Cir. 1990).....	14
<i>In re Clinton</i> ,	14
527 F.2d 1226 (C.C.P.A. 1976).....	14
<i>In re Dembiczak</i> ,	
175 F.3d 994, 998 (Fed. Cir. 1999).....	12
<i>In re Hiraro</i> ,	
535 F.2d, 67, (C.C.P.A. 1966).....	14
<i>In re Kahn</i> ,	
441 F.3d 977, 985 (Fed. Cir. 2006).....	12, 13, 14, 15
<i>In re Regel</i> ,	
526 F.2d, 1399 (C.C.P.A. 1975).....	14
<i>In re Rouffett</i> ,	
149 F.3d 1350, 1357 .....	12
<i>In re Yamamoto</i> ,	
740 F.2d 1569, 1571 (Fed. Cir. 1984).....	30
<i>KSR International Co. v. Teleflex Inc, et al.</i> ,	
127 S. Ct. 1727 (2007).....	14, 15, 17, 18, 19
<i>Medichem S.A. v. Rolabo, S.L.</i> ,	
437 F.3d 1157, 1165 (Fed. Cir 2006).....	15
<i>Sakraida v. AGPro, Inc.</i> ,	
425 U.S. 273 (1976).....	18
<i>United States v. Adams</i> ,	
383 U.S. 39, 40 (1966).....	18
<b>Rules</b>	
<i>MPEP</i> § 2142 .....	10
<i>MPEP</i> § 2143.01 .....	10
<b>Regulations</b>	
35 United States Code § 103(a) .....	11

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**APPELLANTS' MAIN BRIEF ON APPEAL**

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This Brief is submitted in accordance with 37 C.F.R. § 41.67 concerning the Notice of Appeal filed April 4, 2007 in response to the Final Office Action dated October 6, 2006, wherein the Examiner finally rejected claims 1-5 and 7-11 that comprise all of the pending claims in this application.

**I. REAL PARTY IN INTEREST**

The party in interest is LV Partners, L.P., a Texas limited partnership, whose general partner is LV GP, L.L.C., and whose principal office and place of business is at 2626 Cole Avenue, Dallas, Texas 75204.

**II. RELATED APPEALS AND INTERFERENCES**

- U.S. Patent Application Serial No. 07/614,937, Appeal No. 2007-1745 entitled "LAUNCHING A WEB SITE USING A PASSIVE TRANSPONDER" (Atty. Dkt. No. PHLY-25,356), filed on July 11, 2000;

- U.S. Patent Application Serial No. 09/494,924 entitled “INPUT DEVICE FOR ALLOWING INTERFACE TO A WEB SITE IN ASSOCIATION WITH A UNIQUE INPUT CODE” (Atty. Dkt. No. PHLY-24,913), filed on February 1, 2000;
- U.S. Patent Application Serial No. 09/382,374 entitled “METHOD AND APPARATUS FOR ALLOWING A BROADCAST TO REMOTELY CONTROL A COMPUTER” (Atty. Dkt. No. PHLY-24,736), filed on August 24, 1999;
- U.S. Patent Application Serial No. 09/417,863 entitled “SOFTWARE DOWNLOADING USING A TELEVISION BROADCAST CHANNEL” (Atty. Dkt. No. PHLY-24,767), filed on October 23, 1999;
- U.S. Patent Application Serial No. 09/659,170 entitled “ACCESSING A VENDOR WEB SITE USING PERSONAL ACCOUNT INFORMATION RETRIEVED FROM A CREDIT CARD COMPANY WEB SITE” (Atty. Dkt. No. PHLY-25,340), filed on September 11, 2000;
- U.S. Patent Application Serial No. 09/602,034 entitled “CONTROLLING A PC USING A TONE FROM A CELLULAR TELEPHONE” (Atty. Dkt. No. PHLY-25,337), filed on June 23, 2000; and
- U.S. Patent Application Serial No. 09/659,520 entitled “LAUNCHING A WEB SITE USING A PERSONAL DEVICE” (Atty. Dkt. No. PHLY-25,355), filed on September 12, 2000.

Appellants have filed Notices of Appeal in the following related applications:

- U.S. Patent Application Serial No. 09/642,891 entitled “RETRIEVING PERSONAL ACCOUNT INFORMATION FROM A WEB SITE BY READING A CREDIT CARD” (Atty. Dkt. No. PHLY-25,338), filed on August 21, 2000;

- U.S. Patent Application Serial No. 09/382,426 entitled "METHOD AND APPARATUS FOR LINKING A WEB BROWSER TO A PROMOTIONAL OFFER" (Atty. Dkt. No. PHLY-24,732), filed on August 24, 1999; and
- U.S. Patent Application Serial No. 09/568,205 entitled "METHOD AND APPARATUS FOR UTILIZING A UNIQUE TRANSACTION CODE TO UPDATE A MAGAZINE SUBSCRIPTION OVER THE INTERNET" (Atty. Dkt. No. PHLY-24,914), filed on May 9, 2000.

The above-identified patent application has no related interferences.

### **III. STATUS OF CLAIMS**

Claims 1, 2, 4, 5 and 7-11 are pending, stand firmly rejected, and are on appeal here. Claims 1, 2, 4, 5 and 7-11 are set forth in the CLAIMS APPENDIX attached hereto.

### **IV. STATUS OF AMENDMENTS**

A Response was filed after the mailing of the Final rejection dated October 05, 2006, although no amendments were presented in the Response.

### **V. SUMMARY OF CLAIMED SUBJECT MATTER**

The present invention, as now set forth in independent Claim 1, relates to a method for delivering advertising to a consumer over a broadcast media/global communication network combination. The method comprises the steps of generating an advertisement broadcast comprised of a general program that has non-advertising content and associated advertising content dispersed therethrough for broadcast over a broadcast media which is directed to a general class of consumers<sup>1</sup>. The method further comprises the step of embedding in the broadcast unique information for inducing a consumer to view the broadcast for later access to a desired advertiser's location on the global network system over a personal computer-based system<sup>2</sup>. The method further comprises the step of broadcasting to the potential class of consumers the advertisement broadcast with the embedded unique information therein such that

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<sup>1</sup> See Specification, page 12, line 2 – page 13, line 6; page 14, line 24 – page 15, line 18; page 50, lines 15-27.

<sup>2</sup> See Specification, page 15, line 19 – page 17, line 24.

the embedded unique information is presented to the consumer in the same manner as the advertisement broadcast<sup>3</sup>. The unique information is dispersed throughout the advertisement broadcast at different times therein such that the user is induced by at least a first portion of the received unique information to access the desired advertiser's location after a predetermined time in the broadcast.<sup>4</sup> The location of at least a second portion of the unique information in the program broadcast is associated with the non-advertising content of the program broadcast proximate in time thereto.<sup>5</sup> The unique information that is provided at different times in the general broadcast comprises the at least a first portion for informing the consumer that an access will be available at another desired time or the at least a second portion that is delivered to the consumer at the another desired time for allowing the user to access the desired advertiser location through the personal computer-based system.<sup>6</sup> The method further comprises the step of accessing the desired advertiser's location proximate the another desired time in the program.<sup>7</sup>

The present invention, as now set forth in dependent Claim 2, relates to a method of Claim 1, where the method further comprises the step of activating a network or server at the advertiser's location to wait for a response in the form of a network connection to the advertiser's location by a potential consumer. Upon receiving a response from one of the potential consumers, the method further comprises providing additional information to that contained within the advertisement broadcast.<sup>8</sup>

The present invention, as now set forth in dependent Claim 4, relates to a method of Claim 1, where the unique information includes information that is to be transferred to the advertiser's location in the step of accessing.<sup>9</sup>

The present invention, as now set forth in dependent Claim 5, relates to a method of Claim 4, where the unique information that is to be transferred to the desired location is

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<sup>3</sup> See Specification, page 13, lines 1-6; page 17, lines 1-5.

<sup>4</sup> See Specification, page 15, lines 10-18; page 53, line 12 – page 54, line 11.

<sup>5</sup> See Specification, page 53, line 12 – page 54, line 11; page 55, lines 5-25.

<sup>6</sup> See Specification, page 53, line 12 – page 54, line 11.

<sup>7</sup> See Specification, page 53, line 12 – page 54, line 11; page 59, line 19 – page 60, line 14.

<sup>8</sup> See Specification, page 54, line 12 – page 55, line 4.

<sup>9</sup> See Specification, page 53, lines 4-11.

automatically transferred to the advertiser's location when access of the desired advertiser's location is made.<sup>10</sup>

The present invention, as now set forth in dependent Claim 7, relates to the method of Claim 1, where additional information is provided by the advertiser to the consumer at the another time which additional information is transferred to the desired advertiser's location during the step of accessing.<sup>11</sup>

The present invention, as now set forth in dependent Claim 8, relates to the method of Claim 1, where the second portion of the unique information comprises a tone being a substantially unique sound recognizable by the consumer.<sup>12</sup>

The present invention, as now set forth in dependent Claim 9, relates to the method of Claim 8, wherein the tone has embedded therein information that can be decoded by the personal computer-based system and which encoded information is transferred to the desired advertiser's location upon access thereof over the global communication network system.<sup>13</sup>

The present invention, as now set forth in dependent Claim 10, relates to the method of Claim 1, where the unique information comprises a video image being a substantially unique appearance recognizable by the consumer.<sup>14</sup>

The present invention, as now set forth in dependent Claim 11, relates to the method of Claim 10, where the video image has embedded therein information that can be decoded by the personal computer-based system and which encoded information is transferred to the desired advertiser's location upon access thereof over the global communication network system.<sup>15</sup>

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

Claims 1, 2, 4, 5 and 7-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,282,713 to Kitsukawa ("Kitsukawa") in view of U.S. Patent 6,668,133 to

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<sup>10</sup> See Specification, page 53, lines 4-11.

<sup>11</sup> See Specification, page 54, lines 4-11.

<sup>12</sup> See Specification, page 59, line 22 – page 60, line 9.

<sup>13</sup> See Specification, page 58, line 4 – page 59, line 18; page 58, line 12 – page 54, line 11.

<sup>14</sup> See Specification, page 54, lines 4-11; page 57, lines 24-27; page 59, line 22 – page 60, line 9.

<sup>15</sup> See Specification, page 54, lines 4-11; page 57, line 13 – page 58, line 13.

Yuen (“*Yuen*”). Claims 4, 5, 7, 9 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Kitsukawa* in view of *Yuen* in further view of U.S. Patent 5,848,397 to Marsh (“*Marsh*”).

## **VII. ARGUMENT**

As detailed below, the Appellants believe that the Examiner has improperly applied the combination of the *Kitsukawa* and *Yuen* references to claims 1, 2, 4, 5 and 7-11 and the *Kitsukawa*, *Yuen* and *Marsh* references to claims 4, 5, 7, 9 and 11. Specifically, the § 103 rejections based on the combinations of *Kitsukawa* and *Yuen* and *Kitsukawa*, *Yuen* and *Marsh* are clearly not proper and are without basis.

### **A. Rejections under 35 U.S.C. §103**

MPEP § 2142 specifies that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

In regard to what an examiner must show in order to establish a *prima facie* case of obviousness, MPEP § 2142 further explains that:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. . . . Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

In regard to what an examiner must do in order to meet the first criterion for a *prima facie* rejection, MPEP § 2143.01 specifies that:

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art.

In the present application, the various combinations of references proposed by the Examiner are not supported by a proper suggestion or motivation to make each proposed modification. This means that the first criterion for a *prima facie* rejection has not been met, which in turn means the Examiner has failed to carry the burden of establishing a *prima facie* rejection. In addition, certain claim limitations are not taught or suggested by the cited combinations, which means that the third criterion for a *prima facie* rejection has not been met, and that the Examiner has further failed to carry the burden of establishing a *prima facie* rejection for this independent reason. Further, the Examiner has failed to put forth any arguments and has not provided any articulated reasoning as to how any deficiency (missing element) could be solved in a predictable manner through combination with any other reference.

## **B. Recent Decisions Affecting a Finding of Obviousness.**

### **1. In re Kahn.**

With respect to obviousness, a claimed invention is unpatentable if the differences between it and the prior art are “such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art.”<sup>16</sup> Obviousness is a question of law, based upon underlying factual questions which are reviewed for clear error following a bench trial. These “underlying factual inquiries include: (1) The scope and content of the prior art; (2) The level of ordinary skill in the prior art; (3) The difference between the claimed invention and the prior art; and (4) Objective evidence of nonobviousness.”<sup>17</sup>

In *Kahn* the Court noted that:

“. . . to reject claims in an Application under § 103, an Examiner must show and unrebutted *prima facie* case of obviousness . . . on appeal to the board, an Applicant can overcome a rejection by showing insufficient evidence of a *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.”<sup>18</sup> .

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<sup>16</sup> 35 U.S.C. § 103(a) (2000); *In re Kahn*, 441 F.3d 977, 985 (Fed. Cir. 2006) (citing *Graham v. John Deere Co.*, 383 U.S.1, 13-14, 86 S.Ct. 684, 15L, Ed. 2d 545, 1962)

<sup>17</sup> *In re Dembiczaik*, 175 F.3d 994, 998 (Fed. Cir. 1999).

<sup>18</sup> *Kahn*, 441 F.3d at 985

When combining references, it is well recognized that “[m]ost inventions arise from a combination of old elements and each element may often be found in the prior art.”<sup>19</sup> “However, mere identification in the prior art of each element is insufficient to defeat the patentability of the combined subject matter as a whole.”<sup>20</sup> *Kahn* further states:

Rather, to establish a *prima facie* case of obviousness based on a combination of elements disclosed in the prior art, the Board must articulate the basis on which it concludes that it would have been obvious to make the claimed invention. *Id.* In practice, this requires that the Board “explain the reasons one of the ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious.” *Id.* at 1357-59. This entails consideration of both the “scope and content of the prior art” and the “level of ordinary skill in the pertinent art” aspects of the Graham test.<sup>21</sup>

The primary test that has been put forth by the Federal Circuit is the teaching-suggestion-motivation test. *Kahn* set forth that, when there is no explanation provided by the Board to explain the motivation, or the suggestion or the teaching, that would have led a skilled artisan at the time of the invention to the claimed combination as a whole, then the court would infer that hindsight was utilized to conclude that the invention was obvious. *Kahn* relied upon the *Rouffett* case for this teaching at 1358. The “teaching-suggestion-motivation” requirement was set forth to protect against the entry of hindsight into the obviousness analysis, a problem which §103 was meant to confront. Thus, in order to establish a *prima facie* case, some explanation as to teaching, suggestion, or motivation of each of the references and how they can be combined is required.

Although *Kahn* sets forth the teaching-suggestion-motivation test, there is still the “analogous-art” test that must be applied, this being one test that was articulated by the Supreme Court as part of the *Graham* analysis.<sup>22</sup> “The analogous-art test requires that the Board show a reference is either in the field of the Applicant’s endeavor or is reasonably pertinent as to the

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<sup>19</sup> *In re Rouffett*, 149 F.3d 1350, 1357

<sup>20</sup> *Kahn*, 441 F.3d at 986, citing *Rouffett*, 149 F.3d at 1355, 1357

<sup>21</sup> *Kahn*, 441 F.3d at 987

<sup>22</sup> See *Dann v. Johnston*, 425 U.S. at 219, 226, 96 S.Ct. 1393, 47 L.Ed 2d 692 (1976).

problem with which the inventor was concerned in order to rely on that reference as a basis for rejection.”<sup>23</sup> The following was further stated by *Kahn*:

References are selected as being reasonably pertinent to the problem based on the judgment of a person having ordinary skill in the art. *Id.* (“It is necessary to consider the reality of the circumstances, in other words, common sense—in deciding in which fields a person of ordinary skill would reasonably be expected to look for a solution to the problem facing the inventor.” (quoting *In re Wood*, 599 F.2d 1032, 1036 (C.C.P.A. 1979))). We have explained that this test begins the inquiry into whether a skilled artisan would have been motivated to combine references by defining the prior art relevant for the obviousness determination, and that it is meant to defend against hindsight. See *id.*; *In re Clay*, 996 F.2d 656, 659-60 (Fed. Cir. 1992).<sup>24</sup>

As such, the first step of analyzing the combination provided by the Examiner is to examine the references and determine if the combination satisfies the analogous-art test. The next step for determining obviousness is to analyze the teaching-suggestion-motivation test which:

... picks up where the analogous art test leaves off and informs the Graham analysis. To reach a non-hindsight driven conclusion as to whether a person having ordinary skill in the art at the time of the invention would have viewed the subject matter as a whole to have been obvious in view of multiple references, the Board must provide some rationale, articulation, [\*\*23] or reasoned basis to explain why the conclusion of obviousness is correct. The requirement of such an explanation is consistent with governing obviousness law, see § 103(a); *Graham*, 383 U.S. at 35; *Dann*, 425 U.S. at 227-29, and helps ensure predictable patentability determinations.<sup>25</sup>

Even if all of the elements of a claim are disclosed in various prior art references, the long-standing rule that a claimed invention, as a whole<sup>26</sup>, cannot be said to be obvious unless there is some reason or motivation given in prior art why someone would have been prompted to combine the teachings or the references.<sup>27</sup> The prior art itself may suggest desirability of a

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<sup>23</sup> *Kahn*, 441 F.3d at 987.

<sup>24</sup> *Id.*

<sup>25</sup> *Id.*

<sup>26</sup> *In re Hiraro*, 535 F.2d, 67, (C.C.P.A. 1966).

<sup>27</sup> *In re Regel*, 526 F.2d, 1399 (C.C.P.A. 1975); *In re Bond*, 910 F.2d, 831, (Fed. Cir. 1990).

combination, or the motivation may come from other sources (for example, economic factors).<sup>28</sup> Thus, the motivation to combine the relevant art or teachings does not have to be found explicitly in the prior art but, rather, can be implicit thereto. “However, rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”<sup>29</sup><sup>30</sup> The purpose of such requirement is to ensure “due process and non-arbitrary decision making”, as it is in § 103.<sup>31</sup>

*Kahn* articulated the considerations for motivation when analyzing obviousness. The Court stated “the problem examined is not the specific problem solved by the invention, but the general problem that confronted the inventor before the invention was made.”<sup>32</sup> In the reference in *Cross*, the quote that was cited by the Court<sup>33</sup> was that “one of ordinary skill in the art need not see the identical problem addressed in the prior art reference to be motivated to apply its teachings.” As to motivation, the Courts upheld that the evidence of motivation to combine the prior art references “may flow from the prior art references themselves, knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved.”<sup>34</sup> *Kahn* summarized the motivation-suggestion-teaching test as follows:

Therefore, the “motivation-suggestion-teaching” test asks not merely what the references disclose, but whether a person of ordinary skill in the art, possessed with the understandings and knowledge reflected in the prior art, and motivated by the general problem facing the inventor, would have been led to make the combination recited in the claims. See *Cross Med. Prods.*, 424 F.3d at 1321-24. From this it may be determined whether [\*\*26] the overall disclosures, teachings, and suggestions of the prior art, and the level of skill in the art—i.e., the understandings and the knowledge of persons having ordinary skill in the art at the time of

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<sup>28</sup> See e.g. *In re Clinton*, 527 F.2d 1226 (C.C.P.A. 1976); *Cable Elec. Prods., Inc. v. Genmart, Inc.*, 77 F.2d, 1015 (Fed. Cir. 1985).

<sup>29</sup> *Kahn*, 441 F.3d at 998 referring to *Lee*, 277, F.3d at 1343-46 and *Rouffett*, 149 F.3d at 1355-59.

<sup>30</sup> It is noted that the Supreme Court in the recently decided case, *KSR International Co. v. Teleflex Inc. et al.*, 127 S. Ct. 1727 (2007) cited this specific language at page 1741 therein.

<sup>31</sup> *Kahn*, 441 F.3d at 998 referring to *Lee*, 277, F.3d at 1343-46 and *Rouffett*, 149 F.3d at 1355-59.

<sup>32</sup> *Kahn*, 441 F.3d at 988, referring to *Cross Medical Products, Inc. v. Metronics Sofamore Danek, Inc.*, 424 F.3d 1293, 1323 (Fed. Cir. 2005).

<sup>33</sup> *Cross*, 424 F.3d at 1323.

<sup>34</sup> *Medichem S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir 2006), quoting *Brown and Williamson Tobacco Corp. v. Phillip Morris, Inc.*, 229 F.3d, 1120, 1125 (Fed. Cir. 2000).

the invention—support the legal conclusions of obviousness. See *Princeton Biochemicals*, 411 F.3d at 1338 (pointing to evidence supplying detailed analysis of the prior art and the reasons one of ordinary skill would have possessed the knowledge and motivation to combine).<sup>35</sup>

In *Alza Corporation v. Mylan Laboratories, Inc.*, 464 F.3d 1286 (Fed. Cir. 2006), the Federal Circuit has responded to arguments made during pendency of the recently decided Supreme Court case, *KSR International Co v. Teleflex Inc, et al.*, 127 S. Ct. 1727 (2007) and has spelled out its law on obviousness, insisting that it is in harmony with Supreme Court precedent.

In the facts of this case, *Alza* sued Mylan for infringement of its patent (6,124,355) under 35 U.S.C. §271(e)(2) after Mylan sought FDA approval to market a generic version of oxybutynin, a drug used to treat urinary incontinence. The Federal Circuit affirmed the obviousness and non-infringement decisions of the district court.

In the process, Judge Arthur Gajarsa dedicated five pages of his opinion to then outline the Federal Circuit's law on obviousness, responding to many arguments made in the then pending Supreme Court case of *KSR Int'l Co. v. Teleflex, Inc.* (U.S. No. 04-1350). KSR and many amici, including the U.S. government, have challenged the Federal Circuit rule that proof of obviousness must include a showing of a “teaching, suggestion, or motivation” to combine the prior art elements of the claimed invention. *KSR* and others have said that this requirement is too rigid and is inconsistent with Supreme Court decisions issued since *Graham v. John Deere Co.*, 383 U.S. 1 (1966).

Judge Gajarsa wrote the following in his *Alza* opinion:

This requirement has been developed consistent with the Supreme Court's obviousness jurisprudence as expressed in *Graham* and the text of the obviousness statute that directs us to conduct the obviousness inquiry “at the time the invention was made” 35 U.S.C. §103. As we explained in [*In re Kahn*, 441 F.3d 977 (Fed. Cir. 2006)],

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<sup>35</sup> *Kahn*, 441 F.3d at 988.

The motivation-suggestion-teaching test picks up where the analogous art test leaves off and informs the *Graham* analysis. To reach a non-hindsight driven conclusion as to whether a person having ordinary skill in the art at the time of the invention would have viewed the subject matter as a whole to have been obvious in view of multiple references, the Board must provide some rationale, articulation, or reasoned basis to explain why the conclusion of obviousness is correct. The requirement of such an explanation is consistent with governing obviousness law . . .

441 F.3d at 987. We further explained that the “motivation to combine” requirement “[e]ntails consideration of both the ‘scope and content of the prior art’ and ‘level of ordinary skill in the pertinent art’ aspects of the *Graham* test.” *Id.* at 986.

At its core, our anti-hindsight jurisprudence is a test that rests on the unremarkable premise that legal determinations of obviousness, as with such determinations generally, should be based on evidence rather than on mere speculation or conjecture. Our court’s analysis in *Kahn* bears repeating:

A suggestion, teaching, or motivation to combine the relevant prior art teachings *does not have to be found explicitly in the prior art*, as “the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references.... The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art.” However, rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be *some* articulated reasoning with *some* rational underpinning to support the legal conclusion of obviousness. This requirement is as much rooted in the Administrative Procedure Act [for our review of Board determinations], which ensures due process and non-arbitrary decision making, as it is in § 103.

441 F.3d at 987-88 (quoting *In re Kotzab*, 217 F.3d 1365, 1370 (Fed. Cir. 2000)) (citations omitted) (emphases added). There is flexibility in our obviousness jurisprudence because a motivation may be found *implicitly* in the prior art. We do not have a rigid test that requires an actual teaching to combine before concluding that one of ordinary skill in the art would know to combine references. This approach, moreover, does not exist merely in theory but in practice, as well. Our recent decisions in *Kahn* and in [*Cross Med. Prods., Inc., v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293 (Fed. Cir. 2005)] amply illustrate the current state of this court's views.<sup>36</sup>

## 2. KSR

The recently issued Supreme Court Case in *KSR* held that the Federal Circuit's Teaching, Suggestion or Motivation (TSM) test to combine known elements in order to show that the combination is obvious is too rigid. The Court reinforced their position that analysis under *Graham* has been reaffirmed. The Court indicated that its holding was that a "patent for a combination which only unites old elements with no change in their respective functions . . . obviously withdraws what is already known into the field of its monopoly and diminishes the resources available to skillful men."<sup>37</sup> The Court stated that this was a "principal reason for declining to allow patents for what is obvious. The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results."<sup>38</sup> The Court further went on to indicate that there were three cases that illustrated the application of this doctrine of predictability. The first case was *United States v. Adams*, 383 U.S. 39, 40 (1966). In discussing this case, the Court noted that it had "relied upon the corollary principal that when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be non-obvious."<sup>39</sup> In the second case, *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57 (1969), the Court reiterated "while the combination of old elements performed a useful function, it added nothing to the nature and quality of the radiant-heat burner already patented."<sup>40</sup> In the third case, *Sakraida v. AGPro, Inc.*, 425 U.S. 273 (1976), the Court stated that "when a patent 'simply arranges old

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<sup>36</sup> *Alza Corporation v. Mylan Laboratories, Inc.*, 464 F.3d 1286, 1290 (Fed. Cir. 2006).

<sup>37</sup> *KSR*, 127 S. Ct. 1727, 1739 (2007), Citing *Great Atlantic & Pacific Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 152 (1950).

<sup>38</sup> *KSR*, 127 S. Ct. at 1739.

<sup>39</sup> *Id.* at page 1740.

<sup>40</sup> *Id.*

elements with each performing the same function it had been known to perform' and yields no more than one would expect from such an arrangement, the combination is obvious."<sup>41</sup>

The Court summarized these three cases as follows:

The principles underlying these cases are instructive when the question is whether a patent claiming the combination of elements of prior art is obvious. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. *If a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability.* For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida* and *Anderson's-Black Rock* are illustrative-a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.<sup>42</sup> (Emphasis added.)

The Court recognized that following the above stated principals might involve more than "the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement."<sup>43</sup> The Court noted that it might "be necessary for a Court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent that issued."<sup>44</sup> However, the Court also noted that the analysis should be "made explicit" citing *Kahn* wherein it stated that "rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead there must be some articulated reason with some rational underpinning to support the legal conclusion of obviousness."<sup>45</sup> The Court noted that, however, "the analysis need not seek out precise teachings directed to the specific subject matter of the

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<sup>41</sup> *KSR*, 127 S. Ct at page 1740 Citing *Sakraida* at 282.

<sup>42</sup> *Id.* at page 1741.

<sup>43</sup> *KSR*, 127 S. Ct. at page 1741.

<sup>44</sup> *Id.* at page 1741

<sup>45</sup> *Id.*

challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”<sup>46</sup>

Although the Court in this opinion rejected the rigidity of the TSM test, there was some reference to the decision in *Alza* wherein the Court noted the Federal Circuit’s position that “there is flexibility in our obviousness jurisprudence because the motivation may be found *implicitly* in the prior art. We do not have a rigid test that requires an actual teaching to combine . . . ,” citing *Alza*, 464 F.3d at 1291.<sup>47</sup> However, the Court also noted that the *Alza* decision was not before it and that, although they may describe an analysis more consistent with the Court’s earlier precedence, the Court of Appeals would have to consider the current decision in view of its future cases.

### **C. 35 U.S.C. § 103 Rejection**

Summary of Rejection:

- Claims 1-5 and 7-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kitsukawa in view of Yuen.
- Claims 4-5, 7, 9 & 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Kitsukawa and Yuen in further view of Marsh.

Regarding Claims 1-5 and 7-11, the Examiner states in the Final Office Action dated October 5, 2006.<sup>48</sup>

It would have been obvious to one of ordinary skill in the art at the time of the invention was made, to modify Kitsukawa with the technique of alerting the user that supplemental programming is upcoming, at a designated time, at least for the desirable advantage of allowing to timely watch or record the instant programming as taught by Kitsukawa.

Appellants submit that the Examiner simply has broken Appellants’ invention into its component parts and then attempted to find a prior art reference corresponding to each

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<sup>46</sup> *Id.*

<sup>47</sup> *Id.* at page 1743.

<sup>48</sup> See Final Office Action dated October 5, 2006, at page 4.

component to support an obviousness rejection under 35 U.S.C. § 103. In order to establish a *prima facie* case of obviousness using the combinations of *Kitsukawa* and *Yuen*; and *Kitsukawa*, *Yuen* and *Marsh*, the Examiner must show the teachings and the associated suggestions in each reference, in addition to the level of skill in the art, support a conclusion of obviousness as it relates to the entire invention. The combinations of *Kitsukawa*, *Yuen* and *Marsh* are conclusory, and no articulated reasoning with some rational underpinning to support the combinations has been provided. Further, support for the combinations is based on hindsight and the combinations are improper.

**1. Independent Claim 1 as rejected by the combination of *Kitsukawa* and *Yuen*.**

In the Final Office Action, mailed October 5, 2006, the Examiner maintains the 35 U.S.C. § 103 rejection of Claims 1-5 and 7-11. On page 3, paragraph 3 of the Final Office Action, the Examiner states:

Considering amended claim 1, the claimed method for delivering advertising to a consumer over a broadcast media/global communication network, comprising the steps of ‘generating an advertisement broadcast comprised of a general program having non-advertisement content and associated advertising content dispersed there through for a broadcast over a broadcast media which is directed to a general class of consumers’, reads on *Kitsukawa* which teaches that icons or objects that represent advertisements may be presented to a TV viewer during the display of a particular TV broadcast, (*sic*) (Abstract; col. 6, lines 40-53; col. 7, lines 25-35 & Fig. 5). The regular TV broadcast in *Kitsukawa* corresponds with the claimed non-advertisement content.

The claimed feature of ‘embedding in the broadcast unique information for inducing a consumer to view the broadcast for later access to a desired advertiser’s location on the global network over a PC based system’ reads on *Kitsukawa* providing viewers with the advertisements that enable the viewer to connect with catalogs/web sites of manufacturers and dealers, (*sic*) (col. 8, lines 50-67).<sup>49</sup>

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<sup>49</sup> See Final Office Action dated October 5, 2006 at page 3.

In the same paragraph, the Examiner further states “Except for the amended feature of, ‘inducing the consumer to view the broadcast for later access’, even though Kitsukawa teaches that the advertising information may be retrieved at a later time, it is not explicit hath (*sic*) the consumer is induced to view the broadcast at a later time. However, Yuen teaches that it is desirable to alert a viewer of a programming at a later time, col. 2, lines 34-41.”<sup>50</sup> The Examiner concludes:

It would have been obvious for one of ordinary skill in the art at the time the invention was made, to modify Kitsukawa with the technique of alerting the user that supplemental programming is upcoming, at a designated time, at least for the desirable advantage of allowing to timely watch or record the instant programming as taught by Kitsukawa.<sup>51</sup>

## **2. The Cited References – Teaching/Suggestion/Motivation Test.**

The primary step in determining obviousness is to analyze under the Teaching-Suggestion-Motivation test. As previously discussed, the recent *KSR* Supreme Court case indicated that the Teaching-Suggestion-Motivation (TSM) test is not a rigid test; however, it is still considered to be a factor. Under this test, each of the references must contain some type of teaching, as well as some type of suggestion, to allow for the combination. One also must be motivated to combine the references. If this test alone were utilized, the questions that must be answered are whether *Kitsukawa*, *Yuen* and *Marsh* contain any teaching that would suggest to one skilled in the art to combine these three references to overcome the problem addressed by the present application, and whether any motivation to so combine exists.

### **a. Discussion of Kitsukawa**

The primary reference the Examiner has cited is the *Kitsukawa* reference. The primary purpose of *Kitsukawa* is to provide a “system and method for providing advertising information for items used in the scenes of television programs.”<sup>52</sup> *Kitsukawa* provides for on-demand advertising.<sup>53</sup> The advertising information is delivered along with a live or prerecorded

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<sup>50</sup> See Final Office Action mailed October 5, 2006 at page 4.

<sup>51</sup> See Final Office Action mailed October 5, 2006 at page 4.

<sup>52</sup> See *Kitsukawa*, Abstract

<sup>53</sup> See *Kitsukawa*, Col. 6, lines 40-42.

television broadcast.<sup>54</sup> The advertising information also may be delivered prior to the television broadcast.<sup>55</sup> The advertising information may be provided on a smart card.<sup>56</sup> A viewer selects one of a number of display modes from a list of: an advertisement mode; stored advertisement mode; and a non-advertisement mode.<sup>57</sup> The advertising mode enables display of advertising information. The stored advertisement mode enables the storing of advertising information for later access. The non-advertising mode prevents the display of advertising information.<sup>58</sup>

If the user selects the advertisement mode, the *Kitsukawa* system produces an audible tone and provides a display mark in order to alert the user that advertising information is available for an item displaying in a scene of the television broadcast.<sup>59</sup> The display mark may be an icon used to represent various advertised products appearing in the scene.<sup>60</sup> These icons are superimposed over the broadcast of the television program.<sup>61</sup> A viewer, interested in a displayed item, may select an icon corresponding to that displayed item.<sup>62</sup> During the broadcast of the currently selected television program and upon selection of an icon, the system displays advertisement information regarding the displayed item.<sup>63</sup> The system provides, to the viewer, manufacturer information, electronic catalogues, additional products, or electronic links to the manufacturer.<sup>64</sup>

Independent Claim 1 of the instant application recites a method for delivering advertising to a consumer over a broadcast media/global communication network combination. The first step is to generate an advertisement broadcast comprised of a general program having non-advertising content and associated advertising content dispersed therethrough for broadcast over a broadcast media which is directed to a general class of consumers. The second step is to embed, in the broadcast, unique information for inducing a consumer to view the broadcast for later access to a desired advertiser's location on the global network system over a personal

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<sup>54</sup> See *Kitsukawa*, Col. 6, lines 42-54; Col. 8, lines 22-25.

<sup>55</sup> See *Kitsukawa*, Col. 6, lines 54-60.

<sup>56</sup> See *Kitsukawa*, Col. 6, lines 60-63.

<sup>57</sup> See *Kitsukawa*, Col. 6, lines 65-67; and Col. 7, lines 1-2.

<sup>58</sup> See *Kitsukawa*, Col. 7, lines 4-7.

<sup>59</sup> See *Kitsukawa*, Col. 7, lines 10-17.

<sup>60</sup> See *Kitsukawa*, Col. 7, lines 17-21; Col. 8, lines 36-67; and Col. 9, lines 1-11.

<sup>61</sup> See *Kitsukawa*, Col. 7, lines 13-16.

<sup>62</sup> See *Kitsukawa*, Col. 8, lines 36-67; and Col. 9, lines 1-11.

<sup>63</sup> See *Kitsukawa*, Abstract; Col. 8, lines 36-57.

<sup>64</sup> See *Kitsukawa*, Col. 8, lines 36-57.

computer-based system. The Examiner maintains the 35 U.S.C. § 103 rejection on the basis that *Kitsukawa* discloses embedding, in the broadcast, unique information for inducing a consumer to view the broadcast *for later access* to a desired advertiser's location on the global network system over a personal computer-based system. The Examiner cites the *Kitsukawa* disclosure at Column 8, lines 50-67 to provide a teaching for "embedding in the broadcast unique information for inducing a consumer to view the broadcast for later access to a desired location on the global network over a PC based system."<sup>65</sup> The Examiner states, in support of the obviousness rejection, that this limitation in the claims of the instant application "reads on *Kitsukawa* providing viewers with the advertisements that enable to viewer to connect with catalogs/web sites of manufacturers and dealers, (sic)."<sup>66</sup> The portion of the specification cited by the Examiner, including the preceding lines 17-49, is as follows:

In the example that follows, the advertisement mode is selected in the broadcasting system, thereby enabling the display of advertising information, but the embodiment is not so limited. The program scene 502 is one in which an adult actor 590 and a child actor 592 are enjoying a meal. The program scene 520 may be from a live television program or a prerecorded television program, but the embodiment is not so limited. Advertising information is provided for numerous items 511-519 *present in the program scene* 502, as indicated by the displayed advertising marks 521-529. *When advertising information is available for a particular item, a corresponding advertising mark will be displayed on the screen.* The advertising mark may be accompanied by a viewer-controlled alert tone, but the embodiment is not so limited. The displayed advertising marks may be superimposed over the program scene on any portion of the display screen, but the embodiment is not so limited. In an alternate embodiment, a portion of the display screen is allocated to contain the displayed marks, but the embodiment is not so limited.

In one embodiment, the advertising marks are representative of the items to which the marks correspond. For example, the advertising marks may be some combination of alphanumerics and icons representative of the item, but the embodiment is not so limited. The advertising information for a particular item is selected for display by moving a cursor 599 or other pointer to the corresponding advertising mark and selecting the mark. The cursor

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<sup>65</sup> See Final Office Action mailed October 5, 2006, at page 4.

<sup>66</sup> See Final Office Action mailed October 5, 2006, at page 4.

control comprises a remote control device and a mouse, but the embodiment is not so limited. The advertising information displayed for an item may comprise, but is not limited to, manufacturer's information, dealer information, service information, specification information, cost information, and availability. In one embodiment, the advertising information may comprise electronic catalogs that contain information on additional products and services offered by the particular manufacturer and dealer, electronic links to electronic catalogs, electronic links to product manufacturers and dealers that comprise electronic mail and voice messaging links, and electronic links over the Internet to the Web pages of product manufacturers and dealers, but the embodiment is not so limited.

In the displayed program scene 502, for example, advertising information is available for the chair 511 in which the actor 590 is sitting by selecting the corresponding chair icon advertising mark 521. Advertising information is available for the hat 512 worn by the actor 590 by selecting the corresponding hat icon advertising mark 522. Advertising information is available for the hat 513 worn by the child actor 592 by selecting the corresponding hat icon advertising mark 523. Advertising information is available for the flower arrangement 514 by selecting the corresponding vase<sup>67</sup> *(emphasis added)*

*Kitsukawa* does not teach the unique information as recited by the claims of the instant application. Claim 1 of the instant application recites that the unique information induces a consumer to view the broadcast for later access to a desired advertiser's location on a global communication network. *Kitsukawa* contains no disclosure that the icon induces the viewer to access the advertiser's location at a later time. The advertising information that is displayed in *Kitsukawa* is associated with a product that is *displayed in a scene concurrently* with the icon. The viewer is encouraged to access the advertising information while the icon is displayed, not at a later time.

The Examiner agrees that *Kitsukawa* does not teach inducing a viewer to view the broadcast at a later time. The Examiner states:

Except for the amended feature of, 'inducing the consumer to view the broadcast for later access', even though *Kitsukawa* teaches that the advertising information may be retrieved at a later

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<sup>67</sup> See *Kitsukawa* Col. 8, lines 17-67.

time, it is not explicit hath (*sic*) the consumer is induced to view the broadcast at a later time.<sup>68</sup>

However, *Kitsukawa* teaches, and is limited to teaching, that after an icon is selected, the advertising information is displayed and the user is provided the option to store the ad information. *Kitsukawa* contains no disclosure regarding unique information that induces a user to *view the broadcast for later access* to a desired advertiser's location on the global network system over a personal computer-based system.

Additionally, Claim 1 of the instant application recites broadcasting to the potential class of consumers, the advertisement broadcast with the embedded unique information therein, such that the embedded unique information is presented to the consumer in the same manner as the advertisement broadcast. Thereafter, Claim 1 recites that the unique information is dispersed throughout the advertisement broadcast at different times therein such that the user is induced by at least a first portion of the received unique information to access the desired advertiser's location after a predetermined time in the broadcast and wherein the location of at least a second portion of the unique information in the program broadcast is associated with the non-advertising content of the program broadcast proximate in time thereto.

The Examiner cites *Kitsukawa*, Abstract and column 7, lines 10-20 stating: “[as] for the information being at predetermined times, since *Kitsukawa* teaches advertising data may be multiplexed with the program before it is broadcast, and the viewer is provided with an alert that informs the viewer that an advertising will be available, ... the reference reads on the claimed subject matter.”<sup>69</sup> The relevant portion of *Kitsukawa* states:

On-demand electronic advertising information is provided for items used in scenes of television programs. The advertising information is received along with broadcasts of associated television programs. Selected advertisement modes *alert a viewer when advertising information is available for an item displayed in a scene* of the television program broadcast. The viewer alert comprises displayed marks superimposed over the broadcast of the television program. The displayed marks comprise indicators for each item for which advertising data is available, and the indicators may be representative of the items to which the indicators

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<sup>68</sup> See Final Office Action mailed October 5, 2006, at page 4.

<sup>69</sup> See Final Office Action mailed October 5, 2006 at page 5.

correspond. The advertising information for a particular item is selected when the viewer selects the indicator corresponding to the item in which the viewer is interested. Upon selection, the advertising information is displayed along with the broadcast of the currently selected television program. The advertising information may be used to electronically order the associated item.<sup>70</sup>

If an advertisement mode is selected, operation continues at step 408, at which the viewer is alerted *when advertising information is available* for an item displayed in a scene of the television program broadcast. The viewer alert comprises a tone and at least one displayed mark, wherein the displayed mark may be superimposed over the broadcast of the television program on the screen, but the embodiment is not so limited. The displayed mark of one embodiment comprises *an indicator for each item for which advertising data is available*, and the indicators may be representative of the items to which the indicators correspond, but the embodiment is not so limited.<sup>71</sup> (*emphasis added*)

Clearly, this portion of *Kitsukawa* teaches only that an alert is provided while advertising information is available. *Kitsukawa* contains no disclosure that the advertising information is multiplexed with the program before it is broadcast or that the viewer is provided an alert that informs the viewer that advertising information *will be available*.

Further, the claim recites that the unique information that is provided at different times in the general broadcast, comprises the at least a first portion for informing the consumer that an access will be available at another desired time or the at least a second portion that is delivered to the consumer at the another desired time for allowing the user to access the desired advertiser location through the personal computer-based system.

*Kitsukawa* teaches, starting a column 8, line 17, that the icons are displayed at the time in which the advertising information is available. Appellants and the Examiner agree that the advertisements may be presented to a TV viewer *during* the display of a particular TV broadcast. However, the icons are present *only when the corresponding product is contained within the scene of the TV broadcast*. Appellants previously stated that “the particular icons associated with the advertisement are displayed in conjunction with the particular subject matter. For

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<sup>70</sup> See *Kitsukawa*, Abstract.

<sup>71</sup> See *Kitsukawa*, Col. 7, lines 10-20.

example, when a picture of a chair in a broadcast is provided, there is, at the bottom of the display, provided a link to an advertiser associated with that chair. This is provided contemporaneously with the actual picture of the chair such that there is an association between the chair and the advertisement.”<sup>72</sup> *Kitsukawa* discloses that the advertisement is associated with an icon at a particular time in a broadcast. But, *Kitsukawa* contains no disclosure of unique information that is transmitted at *different times* in the broadcast that are different from when the non-advertising content is displayed. In particular, *Kitsukawa* displays only the advertising content that is in conjunction with a particular and associated portion of the program.<sup>73</sup>

In response, the Examiner maintains the rejection stating that:

Applicant’s arguments filed 8/8/2006 have been fully considered but are not persuasive. Applicant’s main argument is that the advertisement alert in *Kitsukawa* is contemporaneous with the program, such that it cannot be at “different times”. However, *Kitsukawa* clearly teaches that any particular scene in the video broadcast may be used to carry an advertisement, since the advertisement may be associated with any particular item in a video broadcast scene, see col. 8, lines 51-65 through col. 9, lines 1-51.<sup>74</sup>

The Examiner maintains this position in the Advisory Action wherein the Examiner states:

Applicant (*sic*) first argument, found on page 4 is in response to examiner’s interpretation of applicant’s prior discussion that the alerts in *Kitsukawa* are “contemporaneous” with the program. Applicant further explains that the remark more specifically is that, it is the fact that the advertisement is associated with an icon at a particular time in the broadcast, but there is no disclosure of unique information that is transmitted at different time (*sic*) in the broadcast that are different from when the non-advertising content is displayed”. First of all, examiner points out that it appears that applicant is referring to the claimed “at least a second portion of the unique information”, which the claims do not recited as being displayed. The claims recite that the ‘second portion’ . . . ‘is

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<sup>72</sup> See Responses filed on August 08, 2006 at page 5, responding to the Office Action mailed February 09, 2006, and the Response filed on April 04, 2007 at page 4 responding to the Final Office Action mailed October 5, 2006.

<sup>73</sup> See Response dated August 08, 2006 at page 5 and Response After Final dated April 04, 2007 at page 4.

<sup>74</sup> See Office Action dated October 05, 2006 at page 2.

associated with the non-advertising content' . . . and 'is delivered to the consumer at the another desired time. . .<sup>75</sup>

Appellants previously stated, "although the Examiner is correct that *Kitsukawa* teaches that any particular scene can be used to carry an advertisement, it is the fact that the advertisement is associated with an icon at a particular time in a broadcast, but there is no disclosure of unique information that is transmitted at different times in the broadcast that are different from when the non-advertising content is displayed. All that is displayed in *Kitsukawa* is the advertising content in conjunction with a particular and associated portion of the program."<sup>76</sup> However, *Kitsukawa* contains no disclosure regarding a first portion of the unique information that induces the user to access the desired advertiser's location after a predetermined time in the broadcast. *Kitsukawa* discloses an icon displayed *concurrently* with an associated product used in a scene in the broadcast. While multiple icons may be displayed, *Kitsukawa* teaches, and is limited to teaching, that each icon is displayed concurrently with the corresponding item to which the icon is related. Claim 1 of the instant application recites a first portion of the unique information for "inducing the user . . ." and a second portion that "is delivered to the consumer..." *Kitsukawa* contains no disclosure for unique information transmitted at different times in the broadcast, where one portion points to a later portion that will be associated to non-advertising content.

Additionally, the Examiner has not provided a reference to teach, or render obvious, the limitation "the unique information, that is provided at different times in the general broadcast, comprises the at least a first portion for informing the consumer that an access will be available at another desired time *or the at least a second portion that is delivered to the consumer at the another desired time* for allowing the user to access the desired advertiser location through the personal computer-based system." The Examiner offers, as reasoning, that "this limitation is recited in the alternative and thus not required to be addressed."<sup>77</sup>

The Examiner maintains his position in the Advisory Action stating:

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<sup>75</sup> See Advisory Action dated May 08, 2007, at page 2.

<sup>76</sup> See Response After Final dated April 04, 2007; at page 4.

<sup>77</sup> See Final Office Action mailed October 5, 2006 at page 3.

As for Applicant's third point, which is in disagreement with examiner's earlier analysis that the claimed 'or the at least second portion that is delivered to the consumer at the another desired time for allowing the user to access the desired advertiser location through the personal computer based system', is recited in the alternative, and thus need not be considered by the examiner. Examiner maintains the above line of reasoning. First, it is respectfully pointed out that the claims do not specifically recite that the 'unique information' is required to include both the 'first portion' and 'second portion'. In particular, claim 1 recites, 'at least a first portion... ...and wherein the location of at least a second portion...is associated with non-advertising content of the program broadcast', ...This language merely discusses that the location of the second portion is..., but does not recite the nature or content of the 'second portion'.<sup>78</sup> (emphasis original)

Denoting a claim limitation as ignorable is improper, as the patent application claims may be given their broadest interpretation consistent with the specification, in order to facilitate sharpening and clarifying the claims at the application stage."<sup>79</sup> Claim 1 clearly requires that unique information be dispersed throughout the advertisement broadcast. This is illustrated in line 10 of Claim 1 where the unique information is referred to as "embedded unique information" that is presented to the consumer in the "same manner" as the advertisement broadcast. Further, the Claim contains no limitation that the unique information is comprised of one piece of information. Claim 1 recites that the unique information comprises a first portion for inducing the user *and* a second portion of the unique information that is associated with a non-advertising content of the program broadcast. Appellants previously stated "[it] is then set forth that the unique information is provided at different times wherein the first portion is for informing the consumer or it is the first portion for inducement. This language merely states that, when unique information occurs, it is either the first portion or the second portion, it clearly being set forth in the claim that the unique information is comprised of a first portion and a second portion."<sup>80</sup> Therefore, the term *or is not an alternative recitation* in the manner construed by the Examiner. The term *or* refers to the fact that when unique information is present in a

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<sup>78</sup> See Advisory Action mailed May 8, 2007 at page 3.

<sup>79</sup> *In re Yamamoto*, 740 F.2d 1569, 1571 (Fed. Cir. 1984) ("The PTO broadly interprets claims during examination of a patent application since the applicant may 'amend his claims to obtain protection commensurate with his actual contribution to the art.'")

<sup>80</sup> See Response to Final Office Action dated April 4, 2007 at page 5.

program, this being a temporal concept, *it is either the first portion or the second portion.*<sup>81</sup> The Examiner is incorrect in not addressing this aspect of the claim as the claim language is clear.

The final step recited by Claim 1 is accessing the desired advertiser's location proximate the another desired time in the program. The Examiner states:

Regarding the further amended claimed feature of 'the first portion of the received unique information to access the desired advertiser's location after a predetermined time, and wherein the location of at least a second portion of the unique information in the program broadcast is associated with non-advertisement content of the program a broadcast of proximate time thereto, such that accessing comprises either the at least first portion for informing the consumer that an access will be available at another desired time,' *Kitsukawa* does not discuss the relationship between inducement and the advertisement.<sup>82</sup>

Appellants and the Examiner agree that *Kitsukawa* does not disclose a relationship between the inducement and the advertisement.

Thus, to apply *Kitsukawa* for the purpose of obviating the claims, the Examiner must show that *Kitsukawa* contains a teaching, suggestion, or motivation to solve the problem solved by Appellants' present claims. *Kitsukawa* must also suggest that, at the time of the invention, a problem existed that could be solved by incorporating a unique information having a first portion and a second portion into a broadcast, and that this unique information would be displayed at different times within the broadcast for inducing the user to watch at a later time within the broadcast and a second portion of the unique information delivered to the viewer at the later time to allow the user access to the desired advertiser location through a personal computer. *Kitsukawa* does not contain any such teaching, suggestion or motivation.

#### **b. The Yuen Reference**

The Examiner has provided the *Yuen* reference to cure the deficiencies in *Kitsukawa*. Specifically, the Examiner has relied upon *Yuen* to "[teach] a cue broadcast simultaneously with the advertisement that alerts a user that supplemental information regarding the advertisement

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<sup>81</sup> See Response to Final Office Action dated April 4, 2007 at page 5.

<sup>82</sup> See Final Office Action dated October 5, 2006 at page 5.

will be broadcast at a later time.”<sup>83</sup> Additionally, the Examiner relies upon *Yuen* to “[disclose] that at the time the invention was made, it was well known in the art to inform a consumer of an upcoming program segments, such as regular broadcast or an advertisement.”<sup>84</sup> The Examiner further states:

It would have been obvious for one of ordinary skill in the art at the time the invention was made, to modify Kitsukawa with the technique of alerting the user that supplemental programming is upcoming, at a designated time, at least for the desirable advantage of allowing to timely watch or record the instant programming as taught by Kitsukawa.<sup>85</sup>

The *Yuen* reference discloses a system of providing a code to a viewer to enable the viewer to program the viewer’s VCR to record a program to be broadcast at a later time.<sup>86</sup> *Yuen* teaches a system wherein a viewer receives a code, or cue, from a printed media or while watching a broadcast. If the user desires to record an upcoming program corresponding to the code, the user may enter the code into a remote control with a decoding means, in accordance with the *Yuen* system.<sup>87</sup> The remote control, upon decoding the code, programs the VCR to record a subsequent event.<sup>88</sup>

In particular, in a disclosed example, *Yuen* teaches that the viewer is watching a broadcast during prime-time when the majority of viewers are watching television. A short advertisement containing an I code is run. The viewer then separately enters the I code into a remote control electronically linked to a VCR. The I code programs the VCR to record a longer advertisement occurring during nonprime time. *Yuen* illustrates this teaching as follows:

FIG. 29b shows an example television broadcast advertisement 654 with an I code 652. The user would identify this code as a I code 652, because the leading digit is zero. It may be very expensive to run a long advertisement during prime time when the majority of viewers are watching television; however, a short advertisement could be run during prime time with the I code and then the user could enter the I code into instant programmer 300,

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<sup>83</sup> See Advisory Action dated May 08, 2007, at page 2.

<sup>84</sup> See Final Office Action mailed October 5, 2006 at pages 5 and 6.

<sup>85</sup> See Final Office Action mailed October 5, 2006 at pages 5 and 6.

<sup>86</sup> See *Yuen*, Abstract.

<sup>87</sup> See *Yuen*, Abstract, Col. 3, lines 15-54.

<sup>88</sup> See *Yuen*, Abstract, Col. 5, line 11 – Col. 6, line 47.

which would command the recording of the longer advertisement for the automobile during the nonprime time. The additional information could be broadcast early in the morning, for example, between midnite and six o'clock in the morning.<sup>89</sup> (*sic*)

The addition of *Yuen* does not render Appellants' invention obvious. *Yuen* does not cure the deficiencies of *Kitsukawa*. As stated hereinabove, the Examiner is using *Yuen* to "[teach] a cue broadcast simultaneously with the advertisement that alerts a user that supplemental information regarding the advertisement will be broadcast at a later time."<sup>90</sup> The Examiner indicates support for this reliance stating that *Yuen* discloses "a viewer watching the channel that see/hears this announcement could reprogram his VCR to record the news or interview at the appropriate time."<sup>91</sup> The relevant portion of *Yuen* sets forth as follows:

Accordingly, there is a need in the art for a simpler system for effecting VCR time preprogramming which will enable a user to take advantage of the recording feature of a VCR more fully and freely.

The prior art in the area of enabling a user to selectively record for a later viewing, detailed information associated with an advertisement is the familiar advertisement by a network during a television channel commercial break that there will be "news at 11" or that there will be an "interview with the winning coach at 9". A viewer watching the channel that sees/hears this announcement could preprogram his VCR to record the "news" or "interview" at the appropriate time. Thus, the concept of having a cue broadcast simultaneously with an advertisement that alerts a user that supplemental information regarding the advertisement will be broadcast at a later time can be implemented easily with standard apparatus such as television and a VCR and is not new to the state of the art. The user could also be informed of an "interview with the winning coach" through print advertisement, which would indicate the channel time and date of the the (*sic*) interview. When the user is informed either through a broadcast or a printed advertisement that a winning team's coach will be interviewed later that day, the viewer uses his standard remote controller to program his VCR to automatically record this later program. The VCR stores the schedule information from the

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<sup>89</sup> See *Yuen*, column 29, lines 38-49.

<sup>90</sup> See Advisory Action dated May 08, 2007, at page 2.

<sup>91</sup> See Advisory Action dated May 08, 2007, at page 2.

controller and, via its display panel, provides acknowledgement to the user of his programming commands.<sup>92</sup>

Clearly, the cited portion of *Yuen* discloses only that a “verbal announcement” can be made informing a viewer that something of interest will be broadcast at a later time. A verbal announcement is not analogous to *embedded unique information* comprising a first portion for inducing and a second portion for allowing access to a desired advertiser’s location. Additionally, the cue in *Yuen* occurs during a first broadcast separate from a second broadcast when the later recording is to occur. Claim 1, of the instant application, recites that the first portion of the unique code is contained within the broadcast itself. *Yuen* teaches, and is limited to teaching, a cue that occurs at a time prior to the broadcast to be recorded.

Further, *Yuen* does not disclose that another cue, or a second portion of the cue, would occur during the later broadcast to be recorded. *Yuen* does not disclose a need for any such cue occurring during the later recording. *Yuen* teaches a system where a code is provided in order to program a VCR. The VCR will, once programmed, automatically record the program occurring during the later broadcast. However, the user enters the code to program the VCR only after the user has decided to record the later broadcast. As such, the code (referenced in one embodiment as a G code and another embodiment as an I code) does not induce the viewer to view the broadcast at a later time. *Yuen* does not contain any teaching, suggestion, or motivation that unique information, *comprising a first portion and a second portion*, would be beneficial.

*Kitsukawa* or *Yuen*, taken either singularly or in combination, does not provide for the use of an embedded signal for both the inducing portion and for the portion that allows access at a later time.<sup>93</sup> The Appellants’ restated this position in the Response filed April 04, 2007, stating that the Examiner is not pointing to anything in the combination of *Yuen* and *Kitsukawa* that in any way shows that there can be a pre-announcement portion and a second portion that is associated with non-advertising content wherein both occur at different times but are still part of the same program.<sup>94</sup> In response, the Examiner states:

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<sup>92</sup> See *Yuen*, column 2, lines 25-51.

<sup>93</sup> See Response dated August 08, 2006, page 5.

<sup>94</sup> See Amendment After Final dated April 04, 2007 at page 5.

Examiner is not pointing to anything in the combination of *Kitsukawa* & *Yuen* that in any way shows that there can be a pre-announcement portion and second portion that is associated with non-advertisement content wherein both occur at different times but are still part of the same program. It is asserted that *Yuen* provides the teaching of the 'first portion', since the teaching of a cue or alert in order to inform viewers of supplemental information (of any content type), was old in the art at the time the invention was made, according to *Yuen*.<sup>95</sup>

However, *Yuen* contains no disclosure regarding unique information that is embedded in a broadcast to induce a consumer to view the broadcast for later access to a desired advertiser's location. Claim 1 requires that the "first portion" is a part of the unique information that is embedded in the broadcast. Neither *Kitsukawa* nor *Yuen* provide the requirement of "unique information, comprising the first portion for inducing and the second portion for allowing access, that is contained within the same broadcast that the user is induced to watch for later access to a desired location. *Yuen* does not cure the deficiencies of *Kitsukawa*.

### **3. Conclusion - TSM Test**

Although the recent *KSR* Supreme Court case has indicated that the Teaching-Suggestion-Motivation (TSM) test is not a rigid test, it is still considered to be a factor. Under this test, there must be some type of teaching in each of the references for combination as well as some kind of suggestion. There also must be some motivation to combine the two references. If this test alone were utilized, the question would be whether there is any teaching in *Kitsukawa* and *Yuen* that would suggest to one skilled in the art to combine the two references or is there any motivation to so combine.

*Kitsukawa* is a reference that provides advertising information for items appearing in the scenes of television programs. When advertising information relating to an item appearing in the displayed scene of the television program is available, *Kitsukawa* provides an alert to notify the viewer that the advertising information can be accessed. *Kitsukawa* also provides an icon related to the item appearing in the scene. The icon is superimposed over the broadcast of the television program. The icon can be specific to the item or generally related to the item. The viewer,

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<sup>95</sup> See Advisory Action mailed May 8, 2007 at page 3.

interested in learning more about the item appearing in the displayed scene, may select the associated icon in order to access the advertising information. The advertising information also is superimposed over the television broadcast. Thereafter, the viewer is given the option to view or store the advertisement. As such, *Kitsukawa* provides the viewer the ability to access the advertising information concurrently with the television program. Though the user has the ability to store the advertisement information for later access, *Kitsukawa* does not disclose that the viewer is *induced to watch the broadcast for later access* to a desired advertiser's location. Additionally, the icon only appears when the corresponding item, for which advertisement information exists, is displayed in a scene in the television program. *Kitsukawa* does not contain a disclosure that the icon can be dispersed throughout the broadcast at different times regardless of the non-advertisement content. Finally, *Kitsukawa* contains no disclosure that the icon can comprise a first portion that induces the viewer to watch the broadcast for a second portion that provides access to the advertiser's location. *Kitsukawa* teaches, and is limited to teaching, that an icon, for linking to advertisement information, is provided contemporaneously with an item appearing in the displayed scene.

*Yuen* is a reference that teaches a system that provides a code used to program VCRs in a more convenient and efficient fashion. Rather than entering the CTL (channel, time and length), a user can enter a code corresponding to the program broadcast the user desires to record. In the Background of the Invention section of the *Yuen* disclosure, *Yuen* discusses that a verbal announcement can be made during a particular program, or a text announcement published in a printed media. The announcement, whether verbal or printed, informs a viewer that something of interest will be broadcast in a program at a later time. Thereafter, the viewer may opt to program their VCR to record the later program. However, *Yuen* does not disclose that this "announcement" or "cue" is provided to the viewer during the same program that the viewer is induced to watch for later access to a desired advertiser's location. Further, the cue discussed in the Background of *Yuen* is a verbal or printed announcement that is not embedded in the broadcast. *Yuen* contains no disclosure regarding a cue, embedded in a broadcast, which *induces the viewer to view the same broadcast for later access* to a desired advertiser's location. Thus, *Yuen* contains no teaching, suggestion of motivation for unique information, embedded in a

broadcast, wherein the unique information comprises a first portion for inducing and a second portion for accessing a desired advertiser's location.

Therefore, no reason, motivation or suggestion exists to combine *Kitsukawa* and *Yuen*. *Kitsukawa* has no need to use the announcement discussed in *Yuen*, as *Kitsukawa* provides that a display marker, i.e., an icon, is superimposed over a television program simultaneously to when a corresponding item appears in a scene of the television program. Since the announcement of *Yuen* informs a viewer when something of interest is going to be broadcast in a later program, the question is "Why would one skilled in the art want to provide an announcement to inform a viewer that a future program will contain an icon that is displayed over a television program only when a corresponding item is displayed in a scene in the television program?" Doing so would be no different than providing an advertisement for the advertised item or the television broadcast. As such, there is no motivation or suggestion that would in any way lead one skilled in the art to combine such.

Based on the TSM test, the Examiner's position is conclusory. The Examiner states that the combination of *Kitsukawa* and *Yuen* would provide unique information embedded in a broadcast, wherein the unique information comprises a first portion for inducing the viewer to watch the broadcast for later access to a desired advertiser's location and a second portion for providing access to a desired advertiser's location. However, the Examiner has provided no articulated reasoning why one skilled in the art would use an announcement made in a separate broadcast to induce a viewer to select an icon that appears only when a corresponding items is displayed in a scene of a television program. Additionally, the Examiner has failed to provide a reference that would illustrate the use of an embedded signal for both the inducing portion and for the portion that allows access at a later time.

#### **4. KSR Test**

The recent *KSR* case, although not fully analyzed as to its impact on obviousness type rejections under 35 U.S.C. § 103, indicates that the test is "if a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability." Under this dictum, the question would be whether *Kitsukawa* could be varied in a predictable manner to provide an embedded signal, embedded in a broadcast, having a first portion for inducing a viewer to watch

the broadcast at a later time and a second portion that allows access to an advertiser's location. *Kitsukawa* would have no use for an announcement that announces a program containing an icon associated with a particular item appearing simultaneously in a scene, was going to appear. In Claim 1, the unique information is embedded in a broadcast and the unique information is comprised of a first portion for inducing and a second portion for allowing access. If the announcement discussed in *Yuen* were used in *Kitsukawa*, there is no indication that the announcement and the icon would be associated as one signal embedded in the same broadcast and that the announcement would induce the viewer to continue to watch the same broadcast for the icon to appear at a later time. The announcement discussed in *Yuen* is not a simple substitution for the first portion of the unique information as the first portion, being part of the unique information, must be embedded within the same broadcast that the viewer watches for later access to a desired advertiser's location. As such, there is no predictable variation of *Kitsukawa* that would lead one skilled in the art to utilize the *Yuen* announcement of a future program for an item of interest occurring in a later broadcast. When work is available in one field of endeavor, i.e., providing advertising information to users, there is no design incentive or other market force that would prompt a predictable variation of *Kitsukawa* to use a verbal or printed announcement for a purpose that is not useful or envisioned in *Kitsukawa*. In summary, Appellants submit that the Examiner has failed to provide a *prima facie* case as to why the *Kitsukawa* and *Yuen* references, in combination, render obvious Appellants' present inventive concept, as defined by Claims 1-5 and 7-11.

**5. Dependent Claims 4, 5, 7, 9 and 11 as rejected by the combination of *Kitsukawa*, *Yuen* and *Marsh*.**

In the Final Office Action mailed October 5, 2006, the Examiner maintains the 35 U.S.C. § 103 rejection of Claims 4, 5 and 7. The Examiner states:

Considering claims 4-5 & 7, *Kitsukawa* does not explicitly discuss embedding information in the advertisement that can be decoded by the PC and transferred back to the advertiser's location upon access thereof by the consumer. Nevertheless, *Marsh* teaches at least embedding an identification code or number, for the purpose of tracking the number of times and by which consumers

the instant commercial has been accessed; see col. 14, lines 20-23 & col. 14, lines 65-67 thru col. 15, lines 1-40.<sup>96</sup>

The Examiner repeats the same argument to support the 35 U.S.C. § 103 rejection of Claims 9 and 11.<sup>97</sup> Claims 4, 5, 7, 9 and 11 depend from and further limit Claim 1. These dependent claims are allowable for at least the same reasons the claims from which they depend as discussed above.

The Examiner provided *Marsh* to cure the deficiencies of *Kitsukawa-Yuen*. Specifically, the Examiner has relied on *Marsh* to “[teach] embedding an identification code or number, for the purpose of tracking the number of times and by which consumers the instant commercial has been accessed.” The Examiner further states:

It would have been obvious for one of ordinary skill in the art at the time the invention was made, to modify *Kitsukawa* with the feature of embedding at least ID information in an advertisement, at least for the desirable benefit of tracking statistics data regarding the instant advertisement, as taught by *Marsh*.<sup>98</sup>

#### **a. Discussion of the Marsh reference.**

The primary purpose of *Marsh* is to provide a method and apparatus for scheduling the presentation of continuously-changing displays to computer users.<sup>99</sup> *Marsh* teaches an advertising scheduler resident on a client's personal computer. An advertisement display scheduler, resident on a server system, determines which advertisements are sent to which users based upon user demographic information. The user demographic information, stored in a database resident on the system server, is obtained from the user via a survey, a member profile, or accessing the client system.<sup>100</sup> Advertisements are transferred and stored on the user's computer in the form of advertisement archives. The advertisement archive includes information used to output the advertisement as well as an identification number or code for the advertisement.<sup>101</sup> The advertisement display scheduler includes the ability to log statistics

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<sup>96</sup> See Final Office Action dated October 05, 2006, at page 7.

<sup>97</sup> See Final Office Action dated October 05, 2006, at page 7.

<sup>98</sup> See Final Office Action dated October 05, 2006, at page 7.

<sup>99</sup> See *Marsh*, Abstract.

<sup>100</sup> See *Marsh*, Col. 3, lines 5-27.

<sup>101</sup> See *Marsh*, Col. 14, lines 8-22.

relating to the presentation of advertisements to users.<sup>102</sup> Each time a new banner advertisement is displayed, the advertisement display scheduler updates a statistics log, stored on the user's personal computer, with the identification number of the advertisement as well as the time and duration the advertisement was displayed. The advertisement display scheduler uses the information stored in the statistics log to determine which advertisements to display. The system server uses the information in the statistics log to determine billing.<sup>103</sup>

*Marsh* is, essentially, a banner-ad system for computer networks. The addition of *Marsh* does not render Appellants' invention obvious. As stated hereinabove, the Examiner is using *Marsh* to "[teach] embedding an identification code or number, for the purpose of tracking the number of times and by which consumers the instant commercial has been accessed." The Examiner cites *Marsh*, col. 14, lines 20-23; col. 14, lines 65-67; and col. 15, lines 1-40. The specific portions of the *Marsh* disclosure cited by the Examiner, including column 14, lines 8-20, state:

In the representative embodiment, advertisements are transferred to and stored at the client computer 101 in the form of advertisement archives. Each advertisement archive comprises information used to output an advertisement (e.g., bitmap information, position information, MPEG information, MIDI information, etc.) and advertisement control information. The advertisement control information for each advertisement includes information such as its priority (e.g., HIGH, MEDIUM, LOW, NO), the maximum number of times the advertisement should be presented, and its expiration date, and other parameters that can be used to control the scheduling of the output of advertisements. Each advertisement archive can also include an identification number or code for the advertisement.<sup>104</sup> (emphasis added)

#### Logging Statistical Information

The advertisement display scheduler 700 can maintain statistics regarding each advertisement that it presents to a user. These statistics are kept in a statistics log file stored on the storage device 206 of the client system 101. Each time a new banner advertisement is displayed, for example, the advertisement display

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<sup>102</sup> See *Marsh*, Col. 4, lines 30-32; and Col. 14, lines 65-67.

<sup>103</sup> See *Marsh*, Col. 15, lines 1-20.

<sup>104</sup> See *Marsh*, Col. 14, lines 8-23.

scheduler 700 updates the statistics log file with the identification of the banner advertisement, the time and date it was displayed, and the duration of the display. This information is then used by the advertisement display scheduler 700 in determining which advertisements to display subsequently, and can be used by the server system 104 for billing and reporting purposes. This information can also be used at the server system 104 by the advertisement distribution scheduler and the advertisement download scheduler. Similar statistics are maintained with respect to the presentation of showcase advertisements. The advertisement display scheduler 700 also can maintain an event log file containing information about various system activity including, for example, actions taken by the user (i.e., "clicking" on an advertisement), timeouts, and so on. Moreover, the server system 104 may send billing information and statistics to the advertiser 108.

It will be appreciated that advertisements may also include community service messages, system information messages, colorful and pleasing artwork, photographic works, logos, slogans and the like. The term advertisement includes content that is other than e-mail messages to and from users of the e-mail system. Advertisements can include text, graphics, sound, animations, video, etc. Thus, it will be appreciated that the advertisement display scheduler 700 can be used to schedule the output of these formats of advertisements.

The advertisement distribution scheduler is located at the server system 104. The advertisement distribution scheduler generates an assignment of advertisements to users and their computers. For example, a particular advertisement for orange juice may be assigned by the advertisement distribution scheduler to all residents of New York City and all college students in Boston. Each advertisement has associated with it an ad contract which specifies a demographic profile reach and frequency, duration and time of expiry for the advertisement. The ad contract can be stored in the<sup>105</sup> (emphasis added)

*Marsh* discloses that an advertisement archive, stored at the user's computer, can include an identification number for the advertisement. In the instant application, Claims 4 and 5 require that the unique information includes information that is to be transferred to the advertiser's location in the step of accessing. However, *Marsh* contains no disclosure regarding unique

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<sup>105</sup> See *Marsh*, Col. 14, lines 65-67; and Col. 15, lines 1-40.

information transferred to the advertiser location in the step of accessing. *Marsh* discloses that information in the statistics log is transferred to a system server for billing. The system server, in *Marsh*, is not an advertiser's location. *Marsh* does not disclose that the system server is accessed when the user accesses an advertiser location. Furthermore, *Marsh* teaches that the statistics log is updated with statistical information from the advertisement display scheduler and stored on the user computer. Clearly, this statistical information is not included as part of a unique information that would have a first portion for inducing and a second portion for allowing access.

Claim 7 of the instant application recites that additional information is provided by the advertiser to the consumer at the another time, which additional information is transferred to the desired advertiser's location during the step of accessing. *Marsh* contains no disclosure regarding any information that is provided by the advertiser. *Marsh* teaches that a system server is selectively accessed<sup>106</sup> to initially establish a user demographic profile, and possibility up date it, and to transfer statistical information for billing. None of the information transferred, in *Marsh*, is information that is provided by advertiser to the consumer. Additionally, none of the information transferred, in *Marsh*, is transferred to an advertiser's location during the step of accessing.

Claims 9 and 11 require a tone or video image that has, embedded therein, information that can be decoded by the personal computer-based system. This encoded information is transferred to the desired advertiser's location upon access thereof over the global communication network system. *Marsh* contains no teaching or suggestion that the identification number is embedded in a tone or video image or created on the user computer. *Marsh* teaches, and is limited to teaching, that the advertisement archive includes an identification number for the advertisement. *Marsh* does not teach or suggest that any information is, or can be, decoded and subsequently transferred to the desired advertiser's location. Although *Yuen* discloses decoding a code to program the VCR, such code is not sent to an advertiser's location. *Kitsukawa*, *Yuen* and *Marsh*, whether applied singularly or in combination, do not teach or suggest information that can be decoded by the personal computer-based system and transferred to the desired advertiser's location.

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<sup>106</sup> See *Marsh*, Col. 5, lines 50-55.

## 6. Conclusion - TSM Test

Although the recent *KSR* Supreme Court case has indicated that the teaching-suggestion-motivation (TSM) test is not a rigid test, it is still considered to be a factor. Under this test, there must be some type of teaching in each of the references for combination as well as some kind of suggestion. There also must be some motivation to combine the two references. If this test alone were utilized, the question would be whether there is any teaching in *Kitsukawa, Yuen and Marsh* that would suggest to one skilled in the art to combine the three references or is there any motivation to so combine.

*Kitsukawa* provides advertising information for items appearing in the scenes of television programs as described hereinabove. *Yuen* teaches a system that provides a code used to program VCRs in a more convenient and efficient fashion. *Marsh* provides a banner advertisement system for electronic mail. *Marsh* teaches an advertisement display scheduler on a client computer and a system server. The advertisement display schedule stores information regarding advertisements, including an identification number for each advertisement, in an advertisement archive. The advertisement display scheduler also maintains a log of statistical information regarding the display of advertisements. To update the statistical information, the advertisement display schedule uses the identification number for a displayed advertisement. Thereafter, the system server uses the statistical information for billing purposes.

Therefore, no reason, motivation or suggestion exists to combine *Kitsukawa, Yuen and Marsh*. *Kitsukawa* has no need to use the identification number in *Marsh*, as *Kitsukawa* provides for a display marker, i.e., an icon, corresponding to an item appearing in a scene of the television program. Since the identification of *Marsh* simply identifies what advertisement was displayed, the question is "Why would one skilled in the art want to provide an identification number for an icon that accesses an advertiser to inform the advertiser what advertisement was displayed?" Doing so would be no different than providing the advertiser with information regarding a connection to their own location. As such, there is no motivation or suggestion that would in any way lead one skilled in the art to combine such.

Based on the TSM test, the Examiner's position is conclusory. The Examiner states that the combination of *Kitsukawa, Yuen and Marsh* would provide additional information, included

in the unique information embedded in a broadcast, wherein the additional information is provided by an advertiser and is transferred to an advertiser when the advertiser's location is accessed. However, the Examiner has provided no articulated reasoning why one skilled in the art would use the identification number of an advertisement with an icon that provides a link to advertiser's location in order to track statistics regarding that advertisement." Additionally, the Examiner has failed to provide a reference that would illustrate additional information provided by the advertiser that is transferred to the advertiser when the advertiser's location is accessed, or that information can be decoded by a personal computer-based system.

## 7. KSR Test

The recent *KSR* case, although not fully analyzed as to its impact on obviousness type rejections under 35 U.S.C. § 103, indicates that the test is "if a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability." Under this dictum, the question would be whether *Kitsukawa* could be varied in a predictable manner to provide an embedded signal, embedded in a broadcast, having a first portion for inducing a viewer to watch the broadcast at a later time, a second portion that allows access to an advertiser's location, and additional information provided by an advertiser, such that the additional information is transferred to the advertiser's location when the advertiser's location is accessed. *Kitsukawa* would have no use for statistical information regarding an icon associated with a particular item appearing simultaneously in a scene. In Claims 4, 5, and 7, the unique information includes additional information, provided by the advertiser, that is transferred to the advertiser during the step of accessing. In Claims 9 and 11, a tone or video image has, embedded therein, information that can be decoded by a personal computer based-system. If the statistical information disclosed in *Marsh* were used in *Kitsukawa*, there is no indication that the information or the icon would be provided by the advertiser or, later, transferred to the advertiser's location. Additionally, if the information disclosed in *Marsh* were used in *Kitsukawa*, there is no indication that the icon or tone would contain any information that would be decoded by a personal computer-based system. As such, there is no predictable variation of *Kitsukawa* that would lead one skilled in the art to utilize the *Marsh* identification number for an advertisement to store statistical information regarding when the advertisement was displayed. When work is

available in one field of endeavor, i.e., providing advertising information to users, there is no design incentive or other market force that would prompt a predictable variation of *Kitsukawa* to use an identification number for a purpose that is not useful or envisioned in *Kitsukawa*. In summary, Appellants submit that the Examiner has failed to provide a *prima facie* case as to why the *Kitsukawa*, *Yuen*, and *Marsh* references, in combination, render obvious Appellants' present inventive concept, as defined by Claims 4, 5, 7, 9 and 11.

**8. Dependent Claims 2, 8, and 10 as rejected by the combination of *Kitsukawa* and *Yuen*.**

Claims 2, 8 and 10 depend from, and further limit, Claim 1. These dependent claims are allowable for at least the same reasons the claim from which they depend, as discussed above.

### **VIII. Conclusion**

In Summary, Appellants submit that the cited references fail to provide a suggestion, motivation, or teaching for the various combinations because the text fails to illustrate “why” one skilled in the art would combine the references in the particular manner required to provide a predictable variation. Instead, the Examiner simply identifies particular components for each reference, combines them in a specific manner required by Appellants’ claimed invention, and then states that it would be obvious to one skilled in the art to do so. This is clearly hindsight based reasoning that contravenes the standards imposed by both the MPEP and the Federal Circuit, and Appellants respectfully submit that the cited combinations are improper for reasons detailed above and requests that the rejections under § 103 be withdrawn.

Respectfully submitted,  
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GMH/mgr/sjg

## CLAIMS APPENDIX

1. A method for delivering advertising to a consumer over a broadcast media/global communication network combination, comprising the steps of:

generating an advertisement broadcast comprised of a general program having non-advertising content and associated advertising content dispersed therethrough for broadcast over a broadcast media which is directed to a general class of consumers;

embedding in the broadcast unique information for inducing a consumer to view the broadcast for later access to a desired advertiser's location on the global network system over a personal computer-based system;

broadcasting to the potential class of consumers the advertisement broadcast with the embedded unique information therein such that the embedded unique information is presented to the consumer in the same manner as the advertisement broadcast;

wherein the unique information is dispersed throughout the advertisement broadcast at different times therein such that the user is induced by at least a first portion of the received unique information to access the desired advertiser's location after a predetermined time in the broadcast and wherein the location of at least a second portion of the unique information in the program broadcast is associated with the non-advertising content of the program broadcast proximate in time thereto, wherein the unique information that is provided at different times in the general broadcast comprises the at least a first portion for informing the consumer that an access will be available at another desired time or the at least a second portion that is delivered to the consumer at the another desired time for allowing the user to access the desired advertiser location through the personal computer-based system; and

accessing the desired advertiser's location proximate the another desired time in the program.

2. The method of Claim 1, and further comprising the steps of:

activating a network or server at the advertiser's location to wait for a response in the form of a network connection to the advertiser's location by a potential consumer; and

upon receiving a response from one of the potential consumers, providing additional information to that contained within the advertisement broadcast.

3. (Canceled)

4. The method of Claim 1, wherein the unique information includes information that is to be transferred to the advertiser's location in the step of accessing.

5. The method of Claim 4, wherein the unique information that is to be transferred to the desired location is automatically transferred to the advertiser's location when access of the desired advertiser's location is made.

6. (Canceled)

7. The method of Claim 1, wherein additional information is provided by the advertiser to the consumer at the another time which additional information is transferred to the desired advertiser's location during the step of accessing.

8. The method of Claim 1, wherein the second portion of the unique information comprises a tone being a substantially unique sound recognizable by the consumer.

9. The method of Claim 8, wherein the tone has embedded therein information that can be decoded by the personal computer-based system and which encoded information is transferred to the desired advertiser's location upon access thereof over the global communication network system.

10. The method of Claim 1, wherein the unique information comprises a video image being a substantially unique appearance recognizable by the consumer.

11. The method of Claim 10, wherein the video image has embedded therein information that can be decoded by the personal computer-based system and which encoded information is transferred to the desired advertiser's location upon access thereof over the global communication network system.

## EVIDENCE APPENDIX

- A. U.S. Patent No. 6,282,713 to Kitsukawa ("Kitsukawa") found in paragraph 1 of the Advisory Action (dated May 08, 2007), paragraphs 3 and 6 of the Final Office Action (dated October 05, 2006), paragraphs 4 and 6 of the Office Action (dated February 9, 2006), paragraphs 3 and 5 of the Final Office Action (dated August 20, 2006), and paragraphs 4 and 6 of Final Office Action (dated June 17, 2007).
- B. U.S. Patent No. 6,668,133 to Yuen ("Yuen") found in paragraph 1 of the Advisory Action (dated May 08, 2007), paragraphs 3 and 6 of the Final Office Action (dated October 05, 2006), and paragraphs 4 and 6 of the Office Action (dated February 9, 2006).
- C. U.S. Patent No. 5,848,397 to Marsh ("Marsh") found in paragraph 6 of the Final Office Action (dated October 05, 2006), paragraph 6 of the Office Action (dated February 9, 2006), paragraph 5 of the Final Office Action (dated August 20, 2006), paragraph 6 of Final Office Action (dated June 17, 2007), paragraphs 4 and 7 of the Final Office Action (dated January 05, 2004), and paragraphs 4 and 7 of the Office Action (dated May 08, 2003).
- D. Response dated April 4, 2007 to Final Office Action mailed October 5, 2006
- E. *Alza Corporation v. Mylan Laboratories, Inc.*, 464 F.3d 1286 (Fed. Cir. 2006)
- F. *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57 (1969)
- G. *Cable Elec. Prods., Inc. v. Genmart, Inc.*, 77 F.2d, 1015 (Fed. Cir. 1985)
- H. *Cross Medical Products, Inc. v. Metronics Sofamore Danek, Inc.*, 424 F.3d 1293, 1323 (Fed. Cir. 2005)
- I. *Dann v. Johnston*, 425 U.S. at 219, 226, 96 S.Ct. 1393, 47 L.Ed 2d 692 (1976)
- J. *In re Bond*, 910 F.2d, 831, (Fed. Cir. 1990)
- K. *In re Clinton*, 527 F.2d 1226 (C.C.P.A. 1976)
- L. *In re Dembicza*, 175 F.3d 994, 998 (Fed. Cir. 1999)
- M. *In re Hiraro*, 535 F.2d, 67, (C.C.P.A. 1966)
- N. *In re Kahn*, 441 F.3d 977, 985 (Fed. Cir. 2006)
- O. *In re Regel*, 526 F.2d, 1399 (C.C.P.A. 1975)
- P. *In re Rouffett*, 149 F.3d 1350, 1357
- Q. *In re Yamamoto*, 740 F.2d 1569, 1571 (Fed. Cir. 1984)
- R. *KSU International Co. v. Teleflex Inc. et al.*, 127 S. Ct. 1727 (2007)
- S. *Medichem S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir 2006)
- T. *Sakraida v. AGPro, Inc.*, 425 U.S. 273 (1976)
- U. *United States v. Adams*, 383 U.S. 39, 40 (1966)



US006282713B1

(12) **United States Patent**  
Kitsukawa et al.

(10) **Patent No.:** US 6,282,713 B1  
(45) **Date of Patent:** Aug. 28, 2001

(51) **METHOD AND APPARATUS FOR PROVIDING ON-DEMAND ELECTRONIC ADVERTISING**

(75) **Inventors:** Tadamasa Kitsukawa, Wyckoff, NJ (US); Andrew Prochil, Gong Szeto, both of New York, NY (US); Keiichi Totsuka, Woodcliff Lake, NJ (US)

(73) **Assignee:** Sony Corporation, Tokyo (JP); Sony Electronics, Inc., Park Ridge, NJ (US)

(\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** 09/218,857

(22) **Filed:** Dec. 21, 1998

(51) **Int. Cl.:** H04N 7/173

(52) **U.S. Cl.:** 725/36, 725/42, 725/37; 725/131

(58) **Field of Search:** 345/327, 348/10, 348/12, 13, 7, 6, 9, 906, 563, 564; 455/4.1, 4.2, 5.1, 6.1, 6.2, 6.3; 725/36, 34, 35, 33, 39, 37, 42, 131, 122

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,202,826	4/1993	McCarthy
5,249,044	9/1993	Von Kohorn
5,260,778	* 11/1993	Kaufman et al.
5,285,278	2/1994	Itolmaa
5,420,666	5/1995	Begun et al.
5,451,998	9/1995	Hamrick
5,469,206	11/1995	Stubble et al.
5,475,470	12/1995	Higgs, Jr. et al.
5,500,681	* 3/1996	Jones
5,523,794	* 6/1996	Mankovitz et al.
5,659,366	* 8/1997	Kerman
5,701,161	12/1997	Williams et al.

5,726,702	3/1998	Itanaguchi et al.
5,727,153	3/1998	Powell
5,767,896	* 6/1998	Neuritsky
5,806,044	9/1998	Powell
5,818,935	* 10/1998	Mai
5,855,007	12/1998	Jovicic
5,887,271	3/1999	Powell
5,905,246	5/1999	Takjowski
5,907,830	5/1999	Lang et al.
5,926,849	* 7/1999	Kihais
5,976,013	* 11/1999	Jones et al.

OTHER PUBLICATIONS

PCT Written Opinion, PCT/US99/29191, Jan 29, 2001, 7 pp.

\* cited by examiner

*Primary Examiner*—Chris Grant

(74) **Attorney, Agent, or Firm:** Blakely, Sokoloff, Taylor & Zafman LLP

(57) **ABSTRACT**

On-demand electronic advertising information is provided for items used in scenes of television programs. The advertising information is received along with broadcasts of associated television programs. Selected advertisement modes alert a viewer when advertising information is available for an item displayed in a scene of the television program broadcast. The viewer alert comprises displayed marks superimposed over the broadcast of the television program. The displayed marks comprise indicators for each item for which advertising data is available, and the indicators may be representative of the items to which the indicators correspond. The advertising information for a particular item is selected when the viewer selects the indicator corresponding to the item in which the viewer is interested. Upon selection, the advertising information is displayed along with the broadcast of the currently selected television program. The advertising information may be used to electronically order the associated item.

54 Claims, 11 Drawing Sheets



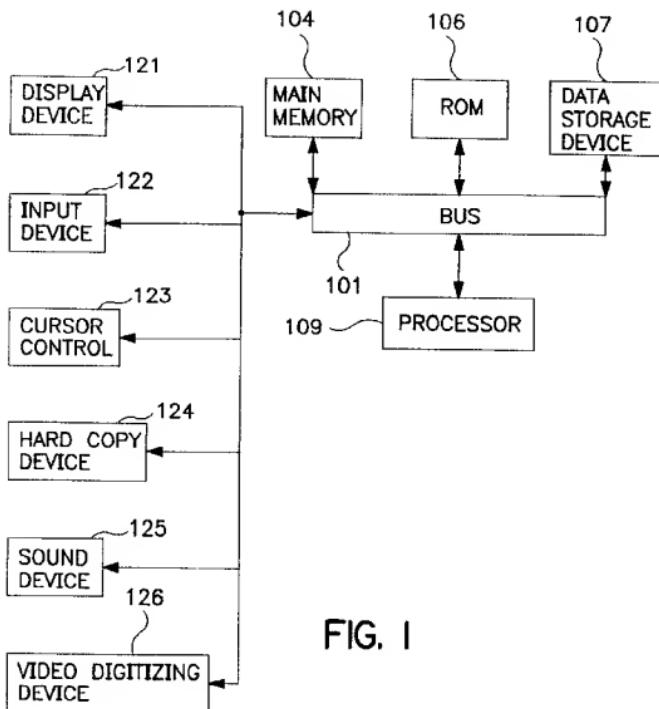


FIG. 1

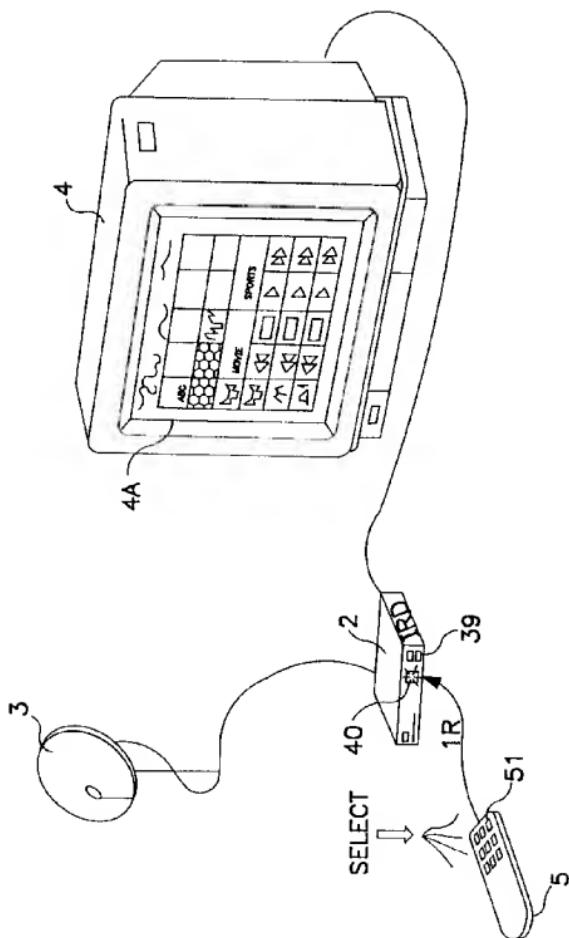


FIG. 2

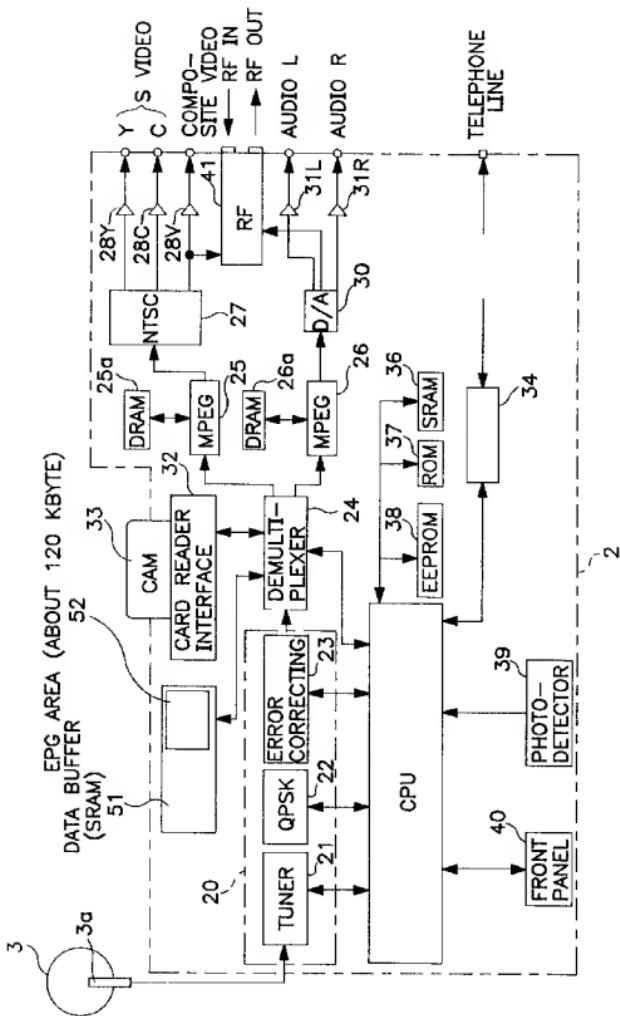


FIG. 3

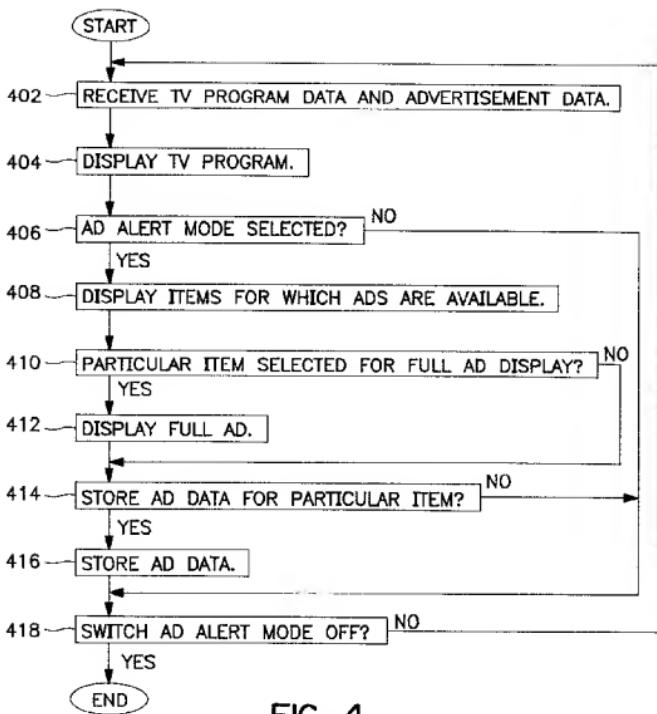
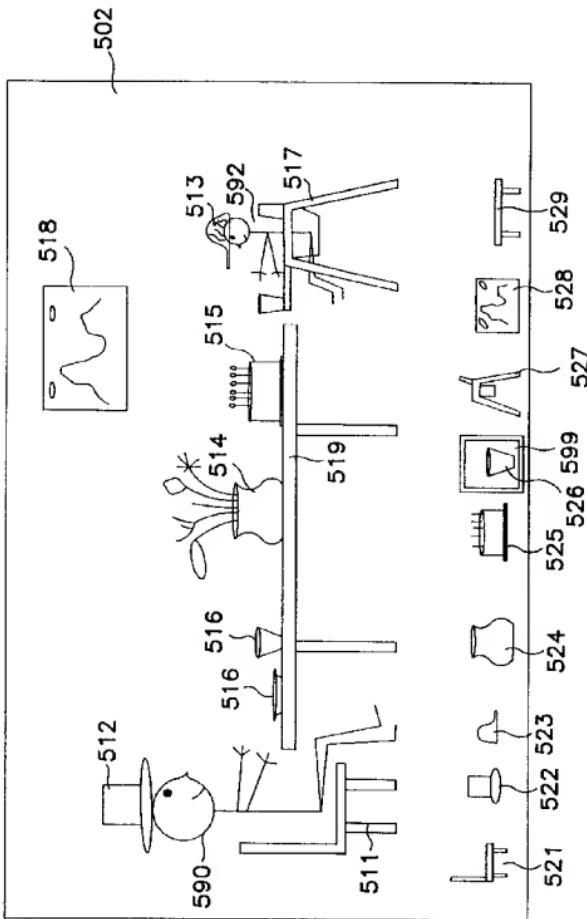


FIG. 4



5

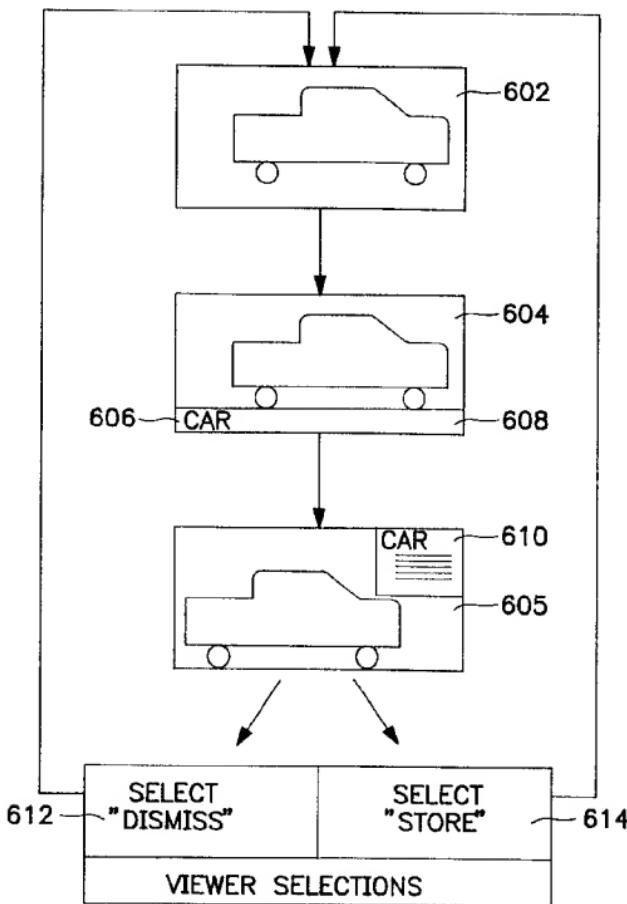


FIG. 6

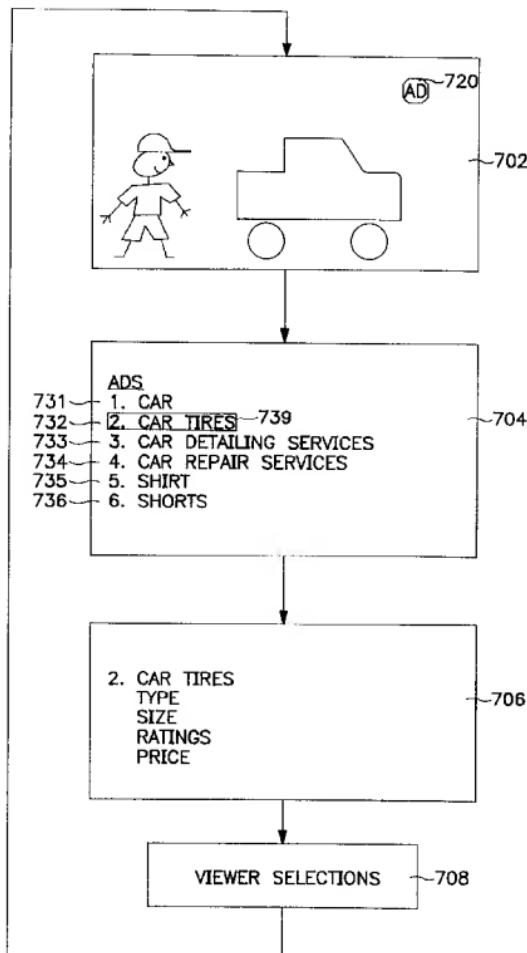


FIG. 7

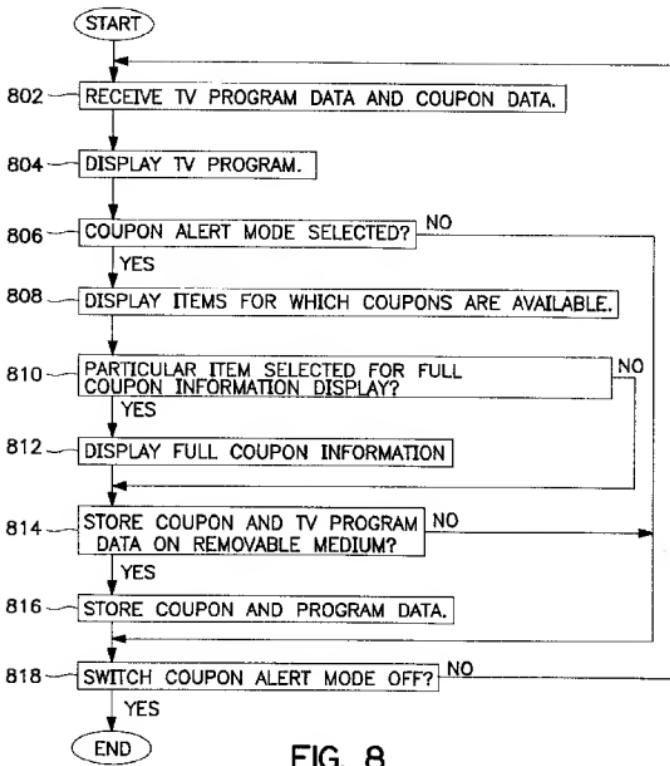


FIG. 8

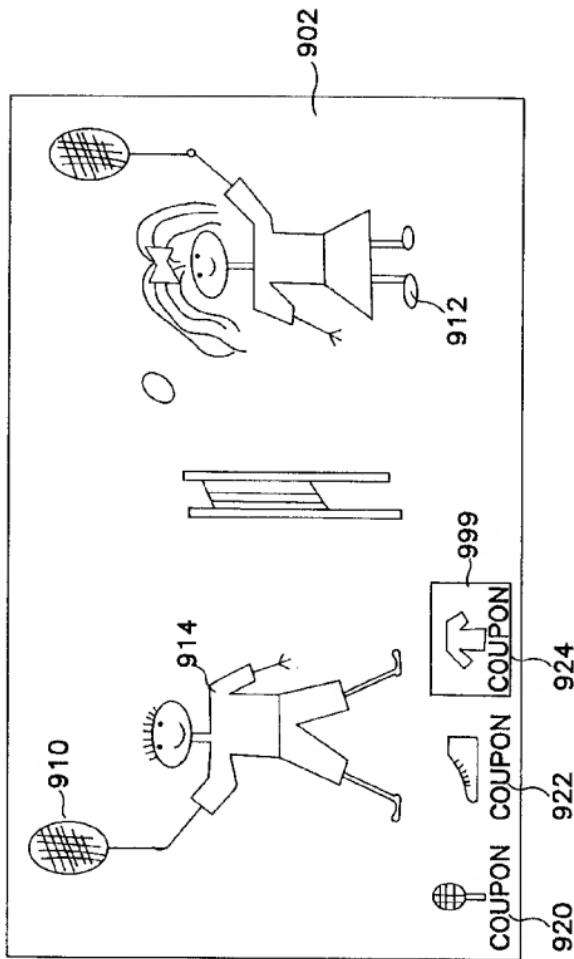


FIG. 9

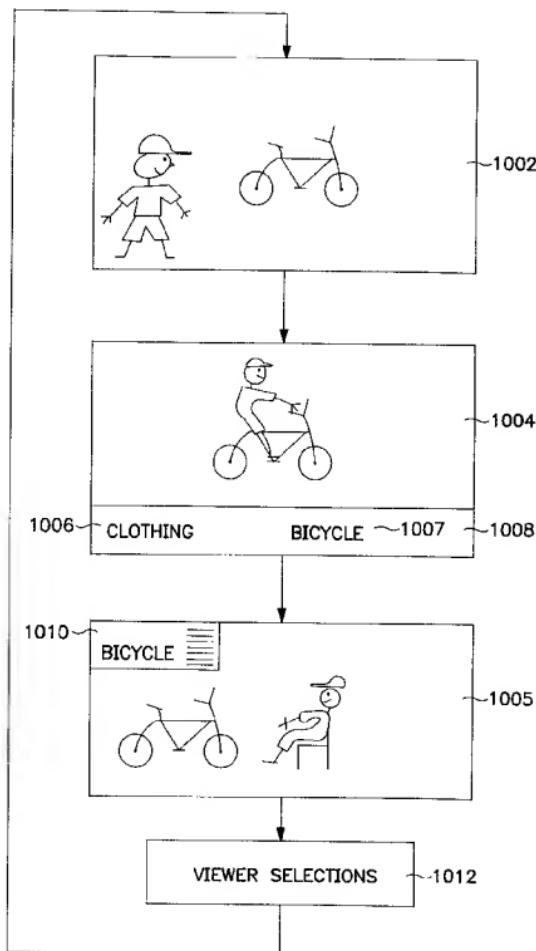


FIG. 10



**METHOD AND APPARATUS FOR  
PROVIDING ON-DEMAND ELECTRONIC  
ADVERTISING**

**FIELD OF THE INVENTION**

The present invention relates to television broadcasting, and, specifically, to providing on-demand electronic advertising information and coupon information along with broadcasts of television programs.

**BACKGROUND OF THE INVENTION**

Television broadcasting technology has improved tremendously since its inception. Today, television signals are broadcasted on the airwaves, through cables, and via satellite. The number of stations and programs accessible today has increased to hundreds of stations. Consequently, the television broadcast systems have increased in complexity in order to present the information on the hundreds of stations to the viewer.

The current generation of complex broadcasting system technology provides the viewer with many options regarding the functions of the broadcasting system and the programs that are available for broadcast. These options include, but are not limited to, choices in presentation graphics, program directories that allow for channel surfing among program descriptions while watching a particular program on one channel, custom user-formatted menus, message receipt functions from a service provider, on-demand selection of pay-per-view broadcasts, selection of a broadcast for automatic recording, and programming a broadcast system to tune to a preselected station at a designated time. These broadcasting system options are typically accessed through graphical user interfaces.

While the broadcast system technology improvements provide viewers with more programming selections and better picture and sound quality, these improvements provide retailers and service providers, the supporters of the broadcast system, with improved medium over which to advertise their products. Retailers and service providers typically derive a benefit from the improved medium because the improved quality of the signals and the programming draw a larger audience, thereby providing them with a larger potential customer base. In spite of the larger potential customer base, there remains a need for an advertising system that better enables retailers and service providers to target customers with more product information and incentive to purchase that is provided with typical commercial segments. Furthermore, as a large number of homes contain personal computers, many of which are used to electronically purchase products and services via direct modem or Internet connections, there is a need to provide potential customers with product information and incentive to purchase that exploits the convenience of electronic purchasing.

The success of the combination of targeted advertising and electronic purchasing is best demonstrated by the financial success of the typical home shopping networks. The typical home shopping network provides products for which they present detailed advertising information and allow for electronic purchasing. This is a form of on-demand advertising because when a viewer wants to shop, the viewer can tune in a home shopping network of their choice, and when the viewer tires of shopping, the viewer can tune to a different network or station. The on-demand nature of the home shopping networks is appreciated by the typical viewer.

One form of advertisement that is very successful is the provision of coupons issued by manufacturers, retailers, and service providers that allow the consumer to save money on particular products during particular times. Typically, coupons are published in magazines and newspapers, and the consumer acquires the coupons by purchasing the magazine or newspaper. In the alternative, consumers are issued a coupon card by a particular retailer, wherein presentation of the coupon card, or electronic coupon, automatically allows the consumer to take advantage of reduced prices on particular goods without having to present coupons corresponding to the particular goods. However, there is a need for providing coupons that are compatible with electronic purchasing methods and which are accompanied by more detailed product information.

**SUMMARY OF THE INVENTION**

A method and apparatus for providing on-demand electronic advertising are provided. According to one aspect of the invention, advertising information is provided for items comprising products and services used in scenes of live and prerecorded television programs. The scenes comprise currently displayed scenes, previously displayed scenes, and scenes that are to be displayed in the future. The advertising information is received along with broadcasts of associated television programs. The advertising information may be received simultaneously with the scenes in which the identified items corresponding to the advertising information appear. Furthermore, the advertising information may be received prior to receipt of the scenes or television programs in which the identified items corresponding to the advertising information appear, in which case the advertising information is stored.

In accessing the advertising information, one of a number of display modes are selected by a viewer or user. The display modes comprise an advertisement mode, a stored advertisement mode, and a non-advertisement mode. When the advertisement mode is selected, the viewer is alerted when advertising information is available for an item displayed in a scene of the television program broadcast. The viewer alert comprises a tone and at least one displayed mark, wherein the displayed marks may be superimposed over the broadcast of the television program on the screen. The displayed marks comprise an indicator for each item for which advertising data is available, and the indicators may be representative of the items to which the indicators correspond.

The advertising information for a particular item is requested when the viewer selects the indicator corresponding to the item in which the viewer is interested. The selection is performed using a cursor or pointer. Upon request, the advertising information is displayed on a display along with the broadcast of the currently selected television program. The advertising information may be displayed by superimposing the information over the broadcast of the television program on the screen. Furthermore, the advertising information may be displayed on a portion of the display along with the television program broadcast, wherein either the advertising information or the television program is displayed on a picture-in-a-picture inset.

The stored advertisement mode causes all of the advertising information for the associated television program to be stored. The stored advertising information is recalled and viewed at a time that is different from the display time of the scene in which the corresponding advertised item appears. When the advertising information is received prior to the

associated television program, timing data is received along with the advertising information. The timing data links the advertising information to the corresponding television program scenes and items. The advertising information may be used to electronically order the associated item. The non-advertisement mode prevents display of advertising information to the viewer.

In addition to the advertising information, coupon information may be provided to a viewer for selected items. The coupon information is received along with the broadcast of a television program. When a coupon mode is selected, the viewer is alerted when the coupon information is available. Selected coupon information is displayed along with the broadcast of a television program.

These and other features, aspects, and advantages of the present invention will be apparent from the accompanying drawings from the detailed description and appended claims which follow.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The objects, features, and advantages of the present invention will be apparent to one skilled in the art from the following detailed description in which:

FIG. 1 is a computer system using one embodiment of the present invention.

FIG. 2 is a diagram of a Direct Satellite (DHS) System of one embodiment of the present invention.

FIG. 3 is a block diagram of an IRD of one embodiment of the present invention.

FIG. 4 is a flowchart of a method for providing on-demand advertising of one embodiment of the present invention.

FIG. 5 is a television program scene displayed along with advertising information alerts of one embodiment of the invention.

FIG. 6 is a sequence of displays of program scenes displayed along with advertising information alerts and advertising information of one embodiment of the invention.

FIG. 7 is a sequence of television program scenes displayed along with advertising information alerts and advertising information of an alternate embodiment of the invention.

FIG. 8 is a flowchart of a method for providing electronic coupons of one embodiment of the present invention.

FIG. 9 is a television program scene displayed along with coupon information alerts of one embodiment of the invention.

FIG. 10 is a sequence of displays of program scenes displayed along with coupon information alerts and coupon information of one embodiment of the invention.

FIG. 11 is a sequence of displays comprising program scenes displayed along with coupon information alerts and coupon information of an alternate embodiment of the invention.

#### DETAILED DESCRIPTION OF THE INVENTION

In the method and apparatus of the present invention the broadcast system described in one embodiment is a direct broadcast satellite system. However, it is readily apparent to one skilled in the art that other processor-based systems that use on-screen menus may use the method and apparatus of the present invention. Furthermore, it is readily apparent to one skilled in the art that other broadcast systems which

have the capability of receiving and displaying a multiplicity of stations may utilize the method and apparatus of the present invention.

In the following description, for purposes of explanation, numerous details are set forth, such as menus, flowcharts and system configurations, in order to provide a thorough understanding of the present invention. However, it will be apparent to one skilled in the art that these specific details are not required in order to practice the present invention. In other instances, well known electrical structures and circuits are shown in block diagram form in order not to unnecessarily obscure the present invention.

It is readily apparent to one skilled in the art that additional functions can be added to the process and functions

modified or removed and still be within the spirit and scope of the invention. The system provides an innovative and user friendly access to a wealth of information regarding goods and services available through the broadcasting system, wherein the broadcasting system comprises high-definition television systems. In the present invention a number of functions are selectable through the remote control device. It is apparent that these functions may be selectable through other devices such as a joystick or other means such as an on screen menu.

FIG. 1 is a computer system 100 using one embodiment of the present invention. The computer system 100 comprises a bus 101, or other communications hardware and software, for communicating information, and a processor 109 coupled to the bus 101 for processing information. The processor 109 represents a central processing unit (CPU) having any type of architecture. The computer system 100 further comprises a random access memory (RAM) or other dynamic storage device in main memory 104 coupled to the bus 101 for storing information and instructions to be executed by the processor 109. The computer system 100 further comprises a read only memory (ROM) 106, or other static storage device, coupled to the bus 101 for storing static information and instructions for the processor 109.

A data storage device 107, such as a magnetic disk or optical disk and a corresponding disk drive, is coupled to the bus 101. The computer system 100 may be coupled via the bus 101 to a display device 121 for displaying information to a user of the computer system 100. Display device 121 can include a frame buffer, specialized graphics rendering devices, a cathode ray tube (CRT), and a flat panel display, but the embodiment is not so limited. An alphanumeric input device 122, including alphanumeric and other keys, may be coupled to the bus 101 for communicating information and command selections to the processor 109. Another type of user input device is a cursor control 123 comprising a mouse, a trackball, a pen, a touch screen, or cursor direction keys for communicating direction information and command selections to the processor 109, and for controlling cursor movement on the display device 121.

In one embodiment, a hard copy device 124 is coupled to the bus 101 and is used for printing instructions, data, and other information on a medium such as paper, film, or similar types of media. Additionally, the computer system 100 can be coupled to a sound device for sound recording and playback 125. The computer system 100 can function as a terminal in a computer network, wherein the computer system 100 is a computer subsystem of a computer network, but the embodiment is not so limited. The computer system 100 may further include a video digitizing device 126. The video digitizing device 126 can be used to capture video images that can be transmitted to other computer systems coupled to the computer network.

FIG. 2 is a diagram of a Direct Satellite System (DBS) of one embodiment of the present invention. The system has an antenna 3, an integrated receiver/decoder 2 (IRD), a remote controller 5, and a monitor 4. Packets of data are transmitted by a transponder on the satellite. Each transponder transmits data in a time share manner at a predetermined frequency. The antenna 3 receives an encoded data signal sent from a satellite. The data is received in encrypted and encoded, or compressed, form. The antenna 3 has a low noise block down converter 3a (LNB). The LNB 3a converts a frequency of a signal sent from the satellite to another frequency. The converted signal is supplied to the IRD 3. A tuner 21 of a decoder is tuned to the frequency of the transponder corresponding to a channel, which is designated by a viewer so that the packets of digital data are received by the decoder. The received encoded signal is decoded by the IRD. The monitor 4 receives a signal from the IRD 3.

FIG. 3 is a block diagram of the IRD of one embodiment of the present invention. A radio frequency (RF) signal output from the LNB 3a of the antenna 3 is supplied to a tuner 21. The output from the tuner 21 is supplied to a quadrature phase shift keying (QPSK) demodulation circuit 22 for demodulation. The output from the QPSK demodulation circuit 22 is supplied to an error correcting circuit 23 for error correction. A transport IC 24 or demultiplexer receives the data stream, consisting of packets of data, from the error correcting circuit 23 and directs portions of the data stream to the appropriate circuit for processing.

The digital data stream sent from a satellite includes headers for classifying the different portions of the data in the digital data stream. The transport IC stores the headers in registers and uses the headers to direct the data. The data stream sent from the satellite includes video data in the format specified by the Motion Pictures Expert Group standard (MPEG), MPEG audio data, electronic programming guide (EPG) data or electronic menu data, on-demand advertising data, and electronic coupon data. Data that is identified by its header to be video data is transferred to an MPEG video decoder 25. Data that is identified by its header to be audio data is transferred to an MPEG audio decoder 26. Similarly, data having a header that identifies the data to be EPG data is transferred to a predetermined area in the data buffer 51 designated to store the EPG or electronic menu. Similarly, data having a header that identifies the data to be on-demand advertising data and electronic coupon data is transferred to a predetermined area in the data buffer 51. The MPEG video decoder 25 decodes the video signal received from the transport IC. Dynamic random access memory (DRAM) 25a, connected to the MPEG video decoder 25, is used for buffering and storage of video data during processing by the MPEG video decoder. The MPEG audio decoder 26 decodes the digital audio signal. The DRAM 26a, connected to the MPEG audio decoder 26, is used for buffering of data and information during processing by the MPEG audio decoder 26.

The CPU 29 is the central control mechanism and executes code stored in the ROM 37 to perform certain functions of the system. For example, the CPU processes certain data to control the generation of the on-demand advertising data and coupon data in accordance with the teachings of the present invention. Furthermore, the CPU receives and processes the user input, received from the front panel buttons or switches 40 and the photodetector circuit 39, to provide the user functionality and access to the system described herein. A remote controller may be utilized by the user to transmit commands and make program selections in accordance with the teachings of the present

invention. Moreover, the CPU accesses user settings and preferences for processing of information and configuration of the system. The user settings are stored in the non-volatile memory, such as electrically erasable programmable read-only memory (EEPROM) 38. The CPU further maintains a list of pointers, stored in static random access memory (SRAM) 36, to the channel information and program information as well as the advertising and coupon data stored in the SRAM 51. Thus, when a user wishes to display a form of the advertising data or coupon data on the screen, the CPU 29, accessing pointers stored in the SRAM 36, communicates to the transport IC 34 to retrieve the data from the data buffer (SRAM) 51 identified by the pointers. The CPU then formulates the format and other digital data which forms the associated information on the screen and forwards the data representative of the associated information to the transport IC 34 which forwards the data to the DRAM 25a of the MPEG video decoder 25 for subsequent output to the screen.

The broadcasting system of one embodiment provides the viewer with programming information for a number of broadcasting stations, as well as providing the viewer with many options regarding the functions of the broadcasting system and the programs that are available for broadcast. These options allow for the controlled presentation of on-demand advertising information and electronic coupon information using an electronic program guide. These options further include, but are not limited to, choices in presentation graphics, program directories that allow for channel surfing among program descriptions while watching a particular program on one channel, custom user-authorized menus, message receipt functions from a service provider, on-demand selection of pay-per-view broadcasts, selection of a broadcast for automatic recording, and programming a broadcast system to tune to a preselected station at a designated time. These broadcasting system options are accessed through graphical user interfaces in the form of on-screen menus. The broadcasting system described herein provides an on-screen menu display that enables the user to easily access and manipulate the functions of the system.

FIG. 4 is a flowchart of a method for providing on-demand advertising of one embodiment of the present invention. Operation begins at step 402, at which advertising information is received along with broadcasts of associated television programs. According to one aspect of the invention, advertising information is provided for items comprising products and services used in scenes of live and prerecorded television programs and live and prerecorded television commercials. The scenes comprise currently displayed scenes, previously displayed scenes, and scenes that are to be displayed in the future, but the embodiment is not so limited. The advertising information may be received simultaneously with the scenes in which the identified items corresponding to the advertising information appear, but the embodiment is not so limited. Furthermore, the advertising information may be received prior to receipt of the scenes or television programs in which the identified items corresponding to the advertising information appear, in which case the advertising information is stored along with timing data that links the advertising information to the corresponding scene or program. Moreover, in another embodiment, the advertising information is provided on a smart card, and the advertising information is synchronized with the broadcast program, but the embodiment is not so limited. The television program is displayed, at step 404.

In accessing the advertising information, one of a number of display modes are selected by a viewer or user. The display modes of one embodiment comprise an advertise-

ment mode, a stored advertisement mode, and a non-advertisement mode, but the embodiment is not so limited. The advertisement mode enables display of the advertising information. The stored advertisement mode results in the storing of the advertising information for presentation at a later time. The non-advertisement mode prevents display of the advertising information. A determination is made, at step 406, whether an advertisement mode is selected. If an advertisement mode is not selected, operation continues at step 418. If an advertisement mode is selected, operation continues at step 408, at which the viewer is alerted when advertising information is available for an item displayed in a scene of the television program broadcast. The viewer alert comprises a tone and at least one displayed mark, wherein the displayed mark may be superimposed over the broadcast of the television program on the screen, but the embodiment is not so limited. The displayed mark of one embodiment comprises an indicator for each item for which advertising data is available, and the indicators may be representative of the items to which the indicators correspond, but the embodiment is not so limited.

Operation continues at step 410, at which the advertising information for a particular item may be selected, or requested, when the viewer selects the indicator corresponding to the item in which the viewer is interested. The selection may be performed using a cursor or pointer, but the embodiment is not so limited. If advertising information is selected for display by the viewer, operation continues at step 412, at which the advertising information is displayed along with the broadcast of the currently selected television program. The advertising information may be displayed by superimposing the information over the broadcast of the television program on the screen, but the embodiment is not so limited. Furthermore, the advertising information may be displayed on a portion of the display along with the television program broadcast, wherein either the advertising information or the television program is displayed on a picture-in-picture inset, but the embodiment is not so limited. Following display of the full advertisement at step 412, operation continues at step 414.

If advertising information is not selected for display by the viewer, operation continues at step 414, at which advertising information for particular items may be stored. If the advertising information is not selected for storage, operation continues at step 418. If the advertising information is selected for storage, operation continues at step 416, at which the advertising information is stored. The stored advertisement mode of one embodiment causes specified portions of the advertising information to be stored. The stored advertising information may be recalled and viewed at a time that is different from the display time of the scene in which the corresponding advertised item appears, but the embodiment is not so limited.

Following storage, a determination is made as to whether the advertisement mode remains selected. If an advertisement mode remains selected, operation continues at step 402 and proceeds as previously detailed. If the advertisement modes are deselected, operation ends as selection of the non-advertisement mode prevents the display of advertising information to the viewer.

FIG. 5 is a television program scene 502 displayed along with advertising information alerts 521-529 of one embodiment of the invention. In one embodiment, the broadcasting system comprises three operating modes, but the embodiment is not so limited. A first mode, the advertisement mode, enables the display of advertising information and corresponding advertising alerts, but the embodiment is not so

limited. A second mode, the stored advertisement mode, causes the received advertising information to be stored, but the embodiment is not so limited. The stored advertisement mode causes advertising information received both simultaneously and prior to receipt of the corresponding scene or program to be stored. As advertising information received prior to the time of the corresponding scene or program broadcast time comprises timing data that links the advertising information to the corresponding scene or program, the timing data is stored along with the advertising information. The stored advertising information may be recalled and viewed at a time that is different from a display time of a scene in which the corresponding advertised item appears. A third mode, the non-advertisement mode, prevents the display of advertising information and corresponding advertising alerts, but the embodiment is not so limited.

In the example that follows, the advertisement mode is selected in the broadcasting system, thereby enabling the display of advertising information, but the embodiment is not so limited. The program scene 502 is one in which an adult actor 590 and a child actor 592 are enjoying a meal. The program scene 520 may be from a live television program or a prerecorded television program, but the embodiment is not so limited. Advertising information is provided for numerous items 511-519 present in the program scene 502, as indicated by the displayed advertising marks 521-529. When advertising information is available for a particular item, a corresponding advertising mark will be displayed on the screen. The advertising mark may be accompanied by a viewer-controlled alert tone, but the embodiment is not so limited. The displayed advertising marks may be superimposed over the program scene on any portion of the display screen, but the embodiment is not so limited. In an alternate embodiment, a portion of the display screen is allocated to contain the displayed marks, but the embodiment is not so limited.

In one embodiment, the advertising marks are representative of the items to which the marks correspond. For example, the advertising marks may be some combination of alphanumerics and icons representative of the item, but the embodiment is not so limited. The advertising information for a particular item is selected for display by moving a cursor 599 or other pointer to the corresponding advertising mark and selecting the mark. The cursor control comprises a remote control device and a mouse, but the embodiment is not so limited. The advertising information displayed for an item may comprise, but is not limited to, manufacturer's information, dealer information, service information, specification information, cost information, and availability. In one embodiment, the advertising information may comprise electronic catalogs that contain information on additional products and services offered by the particular manufacturer and dealer, electronic links to electronic catalogs, electronic links to producer manufacturers and dealers that comprise electronic mail and voice messaging links, and electronic links over the Internet to the Web pages of product manufacturers and dealers, but the embodiment is not so limited.

In the displayed program scene 502, for example, advertising information is available for the chair 511 in which the actor 590 is sitting by selecting the corresponding chair icon advertising mark 521. Advertising information is available for the hat 512 worn by the actor 590 by selecting the corresponding hat icon advertising mark 522. Advertising information is available for the hat 513 worn by the child actor 592 by selecting the corresponding hat icon advertising mark 523. Advertising information is available for the flower arrangement 514 by selecting the corresponding vase

icon advertising mark 524. Advertising information is available for the cake 515 by selecting the corresponding cake icon advertising mark 525. Advertising information is available for the dishware 516 by selecting the corresponding dishware icon advertising mark 526. Advertising information is available for the highchair 517 by selecting the corresponding highchair icon advertising mark 527. Advertising information is available for the artwork 518 by selecting the corresponding artwork icon advertising mark 528. Advertising information is available for the table 519 by selecting the corresponding table icon advertising mark 529.

As an alternative to providing an advertising mark for each item for which advertising information is available, advertising marks may be displayed for general categories of items. For example, all clothing items of a scene for which advertising information is available may be grouped together to be accessed using one general clothing icon, but the embodiment is not so limited. Selecting the clothing icon results in a display comprising a list of each clothing item for which advertising information is available. Selecting an article of clothing from the list results in display of the specific information pertaining to the selected article of clothing.

In another alternate embodiment, a single generic advertising mark may be used to indicate that advertising information is available for at least one item of a scene. Selecting the advertising mark with a cursor or pointing device presents a list of items superimposed over the displayed program broadcast for which advertising information is available. The viewer may then move the cursor to highlight particular items of interest, whereupon selection of a particular item results in a second display comprising particular advertising information about that product.

FIG. 6 is a sequence of displays of program scenes displayed along with advertising information alerts and advertising information of one embodiment of the invention. The first display 602 is a program scene depicting an automobile. When the advertisement mode is selected, in the second display 604, an advertising mark "CAR" 606 is displayed in a portion of the screen 608 reserved for advertising marks. Alternatively, the advertising mark 606 could be superimposed over the program broadcast on the screen. The advertising mark is placed at any location on the screen as selected by the viewer, but the embodiment is not so limited. In a system in which an advertising mark is displayed for each item for which available, the advertising mark 606 indicates advertising information is available for the car. In a system in which a generic advertising mark is displayed for a category of goods and services, the advertising mark 606 indicates advertising information is available for goods and services that are associated with the car.

Following selection of the advertising mark 606, the corresponding advertising information 610 is displayed in the third display 605. The display of the advertising information 610 comprises superimposing the advertising information over the display of the program broadcast 602 and displaying the advertising information 610 in a prespecified or selected portion of the screen, but the embodiment is not so limited. Following display of the advertising information 610, the viewer is provided with two selections 612-614, but the embodiment is not so limited. The viewer may dismiss 612 the advertising information, wherein the advertising information is removed from the program broadcast 602. Furthermore, the viewer may store 614 the advertising information, wherein the advertising information is stored in a buffer or register for later retrieval and removed from the program broadcast 602.

FIG. 7 is a sequence of television program scenes displayed along with advertising information alerts and advertising information of an alternate embodiment of the invention. The first program scene 702 depicts a person with an automobile. This example details a system in which a generic advertising mark is displayed to indicate advertising information is available for at least one of the goods and services depicted in a program scene, but the embodiment is not so limited. When the advertisement mode is selected, an advertising mark in the form of a general icon "AD" 720 is displayed in a portion of the screen reserved for the advertising mark. Alternatively, the advertising mark 720 may be superimposed over the program broadcast on the screen. The advertising mark is placed at any location on the screen as selected by the viewer, but the embodiment is not so limited.

Following selection of the advertising mark 720, the corresponding advertising information 704 is displayed. The display of the advertising information 704 comprises superimposing the advertising information over the display of the program broadcast 702 and displaying the advertising information 730 in a prespecified or selected portion of the screen, but the embodiment is not so limited. The advertising information 704 comprises information for the car 731, the car tires 732, car detailing services 733, car repair services 734, the shirt 735, and the shorts 736. A viewer-controlled cursor 739 or pointer is used to select advertising information on the car tires 732. The car tire advertising information 706 is displayed.

Following display of the selected advertising information 706, the viewer is provided with two selections, but the embodiment is not so limited. The viewer may dismiss the advertising information, wherein the advertising information is removed from the program broadcast. Furthermore, the viewer may store the advertising information, wherein the advertising information is stored in a buffer or register for later retrieval and removed from the program broadcast.

In addition to the on-demand advertising information, a broadcast system viewer may be presented with electronic coupon information. FIG. 8 is a flowchart of a method for providing electronic coupons of one embodiment of the present invention. Operation begins at step 802, at which coupon information is received along with broadcasts of associated television programs. According to one aspect of the invention, coupon information is provided for items comprising products and services. The products and services may be used in scenes of live and prerecorded television programs and live and prerecorded television commercials, wherein the scenes comprise currently displayed scenes, previously displayed scenes, and scenes that are to be displayed in the future, but the embodiment is not so limited. The coupon information may be received simultaneously with the scenes in which the identified items corresponding to the coupon information appear, but the embodiment is not so limited. Furthermore, the coupon information may be received prior to receipt of the scenes or television programs in which the identified items corresponding to the coupon information appear, in which case the coupon information is stored along with timing data that links the coupon information to the corresponding scene or program. The television program is displayed, at step 804.

In accessing the coupon information, one of a number of display modes are selected by a viewer or user. The display modes of one embodiment comprise a coupon mode, a stored coupon mode, and a non-coupon mode, but the embodiment is not so limited. The coupon mode enables display of the coupon information. The stored coupon mode results in the storing of the coupon information for prescu-

tation at a later time. The non-coupon mode prevents display of the coupon information. A determination is made, at step 806, whether a coupon mode is selected. If a coupon mode is not selected, operation continues at step 818.

If a coupon mode is selected, operation continues at step 808, at which the viewer is alerted when coupon information is available. The viewer alert comprises a tone and at least one displayed mark, wherein the displayed marks may be superimposed over the broadcast of the television program on the screen, but the embodiment is not so limited. The displayed marks of one embodiment comprise an indicator for each item for which coupon data is available, and the indicators may be representative of the items to which the indicators correspond, but the embodiment is not so limited.

Operation continues at step 810, at which the coupon information for a particular item may be selected, or requested, when the viewer selects the indicator corresponding to the item in which the viewer is interested. The selection may be performed using a cursor or pointer, but the embodiment is not so limited. If coupon information is selected for display by the viewer, operation continues at step 812, at which the full coupon information is displayed on the display along with the broadcast of the currently selected television program. The coupon information may be displayed by superimposing the information over the broadcast of the television program on the screen, but the embodiment is not so limited. Furthermore, the coupon information may be displayed on a portion of the display along with the television program broadcast, wherein either the coupon information or the television program is displayed on a picture-in-a-picture inset, but the embodiment is not so limited. Following display of the full coupon information at step 812, operation continues at step 814.

If coupon information is not selected for display by the viewer, operation continues at step 814, at which coupon information for particular items may be stored on a removable recording medium. If the coupon information is not selected for storage, operation continues at step 818. If the coupon information is selected for storage, operation continues at step 816, at which the coupon information is stored on the removable recording medium. The removable recording medium comprises integrated circuit cards, or "smart" cards, magnetic medium, and optical medium. In an alternate embodiment, the coupon information may be provided to a system printer, wherein the system printer provides a printed coupon that may be redeemed by the viewer.

In one embodiment, data corresponding to the television program with which the coupon information is associated is stored on the removable recording medium along with the coupon information. The data corresponding to the television program comprises, but is not limited to, the program title, the program description, the date of airing, the time of airing, and the channel on which the program is aired.

Following storage, a determination is made as to whether the coupon mode remains selected. If a coupon mode remains selected, operation continues at step 802 and proceeds as previously described. If the coupon modes are deselected, operation ends as selection of the non-coupon mode prevents the display of coupon information to the viewer.

In one embodiment, the coupon information is redeemed by the viewer when the stored coupon information is read from the removable recording medium by a merchandise retailer or dealer. Furthermore, the data corresponding to the television program may be read from the removable recording medium by the merchandise retailer, but the embodiment

is not so limited. In an alternate embodiment, the coupon information is redeemed by the viewer via an electronic link established with a merchandise retailer or dealer, wherein the electronic link allows the merchandise retailer to read the stored coupon information from the recording medium of the viewer at such time as the viewer electronically orders or purchases merchandise. The electronic link may allow the merchandise retailer to read the data corresponding to the television program; an alternative, however, establishes a second electronic link between the viewer's system and the collection center, wherein the collection center reads the data corresponding to the television program using this second electronic link. The data corresponding to the television program is electronically transferred to a collection center for statistical television data, but the embodiment is not so limited. The electronic transfer of the data corresponding to the television program may occur between the viewer's system and the collection center, or between the retailer's system and the collection center, but the embodiment is not so limited.

At least one condition precedent may require satisfaction prior to allowing redemption of coupon information by the viewer. For example, a viewer may be required to watch a particular program or combination of programs as a condition precedent to using selected coupon information. In one embodiment, the condition precedent is required to be satisfied prior to allowing the storing of selected coupon data on the removable recording medium. In an alternate embodiment, the coupon information is stored on the removable recording medium, and the condition precedent is required to be satisfied prior to allowing the coupon data to be read by the merchandise retailer or dealer.

FIG. 9 is a television program scene 902 displayed along with coupon information alerts 920-922 of one embodiment of the invention. In one embodiment, the broadcasting system comprises three operating modes, but the embodiment is not so limited. A first mode, the coupon mode, enables the display of coupon information and corresponding coupon alerts, but the embodiment is not so limited. A second mode, the stored coupon mode, causes the received coupon information to be stored for later retrieval, but the embodiment is not so limited. The stored coupon mode causes coupon information received both simultaneously and prior to receipt of the corresponding scene or program to be stored. As coupon information received prior to the time of the corresponding scene or program broadcast time comprises timing data that links the coupon information to the corresponding scene or program, the timing data is stored along with the coupon information. The stored coupon information may be recalled and viewed at a time that is different from a display time of a scene in which the corresponding advertised item appears. A third mode, the non-coupon mode, prevents the display of coupon information and corresponding coupon alerts, but the embodiment is not so limited.

In the example that follows, the coupon mode is selected in the broadcasting system, thereby enabling the display of coupon information, but the embodiment is not so limited. The program scene 902 is one in which two actors are enjoying a game of tennis. The program scene 920 may be from a live television program or a prerecorded television program, but the embodiment is not so limited. In one embodiment, coupon information is provided for numerous items 910-914 present in the program scene 902, as indicated by the displayed coupon marks 920-924; however, coupon information may be provided for items that are not present in the program scene 902. When coupon information

is available for a particular item, a corresponding coupon mark will be displayed on the screen. The coupon mark may be accompanied by a viewer-controlled alert tone, but the embodiment is not so limited. The displayed coupon marks may be superimposed over the program scene on any portion of the display screen, but the embodiment is not so limited. In an alternate embodiment, a portion of the display screen is allocated to contain the displayed coupon marks, but the embodiment is not so limited.

In one embodiment, the coupon marks are representative of the items to which the marks correspond. For example, the coupon marks may be some combination of alphanumericics and icons representative of the item, but the embodiment is not so limited. The coupon information for a particular item is selected for display by moving a cursor 999 or other pointer to the corresponding coupon mark and selecting the mark. The cursor control comprises a remote control device and a mouse, but the embodiment is not so limited. The coupon information displayed for an item may comprise, but is not limited to, manufacturer's information, dealer information, service information, specification information, cost information, redemption information, and dates of validity. In one embodiment, the coupon information may comprise electronic catalogs that contain information on additional products and services offered by the particular manufacturer and dealer and service provider, electronic links to electronic catalogs, electronic links to product manufacturers and dealers that comprise electronic mail and voice messaging links, and electronic links over the Internet to the Web pages of product manufacturers and dealers, but the embodiment is not so limited.

In the displayed program scene 902, for example, coupon information is available for the tennis racket 910, the shoes 912, and the clothing 914. Coupon information is available for the tennis racket 910 by selecting the corresponding tennis racket icon coupon mark 920. Coupon information is available for the shoes 912 by selecting the corresponding shoe icon coupon mark 922. Coupon information is available for the clothing 914 by selecting the corresponding clothing icon coupon mark 924.

As an alternative to providing a coupon mark for each item for which coupon information is available, coupon marks may be displayed for general categories of items. For example, all clothing items of a scene for which coupon information is available may be grouped together to be accessed using one general clothing icon, but the embodiment is not so limited. Selecting the clothing icon results in a display comprising a list of each clothing item for which coupon information is available. Selecting an article of clothing from the list results in display of the specific coupon information pertaining to the selected article of clothing.

In another alternate embodiment, a single generic coupon mark may be used to indicate that coupon information is available for at least one item of a scene. Selecting the coupon mark with a cursor or pointing device presents a list of items superimposed over the displayed program broadcast for which coupon information is available. The viewer may then move the cursor to highlight particular items of interest, whereupon selection of a particular item results in a second display comprising particular coupon information about that product.

FIG. 10 is a sequence of displays of program scenes displayed along with coupon information alerts and coupon information of one embodiment of the invention. The first program scene 1002 depicts an actor and a bicycle. When the coupon mode is selected, in the second display 1004, coupon

marks "CLOTHING" 1006 and "BICYCLE" 1007 are displayed in a portion of the screen 1008 reserved for coupon marks. Alternatively, the coupon marks 1006-1007 could be superimposed over the program broadcast on the screen. The coupon marks are placed at any location on the screen as selected by the viewer, but the embodiment is not so limited. In a system in which a coupon mark is displayed for each item for which available, the coupon marks 1006-1007 indicate coupon information is available for the clothing and the bicycle. In a system in which a generic coupon mark is displayed for a category of goods and services, the coupon mark indicates coupon information is available for goods and services that are associated with the category.

Following selection of the bicycle coupon mark 1007, the corresponding advertising information 1010 is displayed. The display of the coupon information 1010 comprises superimposing the coupon information over the display of the program broadcast and displaying the coupon information 1010 in a prespecified or selected portion of the screen, but the embodiment is not so limited. Following display of the coupon information 1010, the viewer is provided with two selections 1012, but the embodiment is not so limited. For a first selection, the viewer may dismiss the coupon information, wherein the coupon information is removed from the program broadcast. For a second selection, the viewer may store the coupon information, wherein the coupon information is stored on a removable recording medium.

FIG. 11 is a sequence of displays comprising program scenes displayed along with coupon information alerts and coupon information of an alternate embodiment of the invention. The first display 1102 depicts a person with two dogs. This example details a system in which a generic coupon mark is displayed to indicate the availability of coupon information for at least one of the goods and services depicted in a program scene, but the embodiment is not so limited. When the coupon mode is selected, a coupon mark in the form of a general icon "SAVING" 1120 is displayed in a portion of the screen reserved for the coupon mark. Alternatively, the coupon mark 1120 may be superimposed over the program broadcast on the screen. The coupon mark is placed at any location on the screen as selected by the viewer, but the embodiment is not so limited.

Following selection of the coupon mark 1120, the corresponding coupon information 1104 is displayed. The display of the coupon information 1104 comprises superimposing the coupon information over the display of the program broadcast 1102 and displaying the coupon information 1104 in a prespecified or selected portion of the screen, but the embodiment is not so limited. The coupon information 1104 comprises information for pet products 1131, pet services 1132, and clothing 1133, but the embodiment is not so limited. A viewer-controlled cursor 1139 or pointer is used to select coupon information on the pet services 1132. Upon selection, the pet services 1106 are displayed for which coupon information is available. The cursor 1149 is used to select coupon information on pet sitting, whereupon selection the coupon information on pet sitting 1107 is displayed.

Following display of the selected advertising information 1106, the viewer is provided with two selections 1108, but the embodiment is not so limited. As a first selection, the viewer may dismiss the coupon information from the program broadcast. As a second selection, the viewer may store selected coupon information, wherein the selected coupon information is stored on a removable recording medium. The coupon information on the removable recording medium may be

redeemed by the viewer either using an electronic link or by presenting the removable recording medium to a retailer or dealer for reading, but the embodiment is not so limited.

The invention has been described in conjunction with the preferred embodiment. Although the present invention has been described with reference to specific exemplary embodiments, it will be evident that various modifications and changes may be made to those embodiments without departing from the broader spirit and scope of the invention as set forth in the claims. Accordingly, the specification and drawings are to be regarded in an illustrative rather than a restrictive sense.

What is claimed is:

1. A method comprising:  
receiving advertising information for an item along with a broadcast of a program, wherein the item is associated with a scene of the program;  
displaying an advertising mark for the item on a display along with the associated scene of the broadcasted program, wherein displaying an advertising mark comprises a non-advertisement mode and a stored advertisement mode, the advertising marks being disabled in the non-advertisement mode and the advertising marks being stored before display in the stored advertisement mode;  
and upon selection of the advertising mark by a viewer, displaying the advertising information on the display along with the broadcasted program.
2. The method of claim 1, further comprising:  
storing received advertising information on a smart card; and  
storing information on the smart card regarding the associated broadcasted program in association with the advertising information.
3. The method of claim 1, further comprising providing an alert to a viewer when advertising information is available for an item in a displayed scene, wherein the alert comprises at least one of a tone and a displayed advertising mark.
4. The method of claim 1, wherein the displayed scene comprises currently displayed scenes, previously displayed scenes, and scenes that are to be displayed in the future.
5. The method of claim 1, wherein the displayed advertising mark is superimposed over the broadcasted program on the display.
6. The method of claim 1, wherein the displayed advertising mark comprises an indicator that the advertising information is available for the item in the displayed scene.
7. The method of claim 1, wherein the displayed advertising mark comprises an indicator for each item for which the advertising information is available, wherein the indicator is representative of the item to which the indicator corresponds.
8. The method of claim 7, further comprising receiving a viewer selection of an indicator corresponding to an item and displaying the advertising information associated with the item.
9. The method of claim 1, wherein the stored advertisement mode causes all of the advertising information for the program to be stored, wherein the stored advertising information is recalled and viewed at a time that is different from a display time of a scene in which an advertised item appears.
10. The method of claim 1, wherein displaying the advertising information comprises superimposing the advertising information over the broadcasted program on the display.
11. The method of claim 1, wherein displaying the advertising information comprises displaying the advertising

information on a portion of the display along with the broadcasted program, wherein the portion of the display is selectable by a viewer.

12. The method of claim 1, wherein the advertising information is received simultaneously with the scene in which the advertised item appears.
13. The method of claim 1, wherein the advertising information is received prior to receipt of the broadcasted program, and wherein the prior received advertising information is stored.
14. The method of claim 13, further comprising receiving timing data that links the advertising information to the corresponding scene.

15. The method of claim 1, wherein the program comprises live television programs, prerecorded television programs, live television commercials, prerecorded television commercials, movies, and pay-per-view programming.

16. The method of claim 1, wherein the item comprises at least one of a product and a service.

17. The method of claim 1, further comprising controlling presentation of the advertising information using an electronic program guide.

18. The method of claim 1, wherein the advertising information comprises electronic links to at least one of a manufacturer and dealer of the item, wherein the electronic links comprise links to at least one of Web pages and electronic catalogs.

19. The method of claim 1, further comprising receiving a request from the viewer for electronically ordering the item using the advertising information.

20. The method of claim 1, further comprising storing advertising information for the item for a prespecified period of time after the corresponding broadcasted program ends.

21. The method of claim 1, further comprising:  
receiving coupon information along with the broadcasted program;  
alerting a viewer when the coupon information is available; and  
displaying the coupon information on a display along with the broadcasted program.

22. A broadcasting system comprising:  
a processor coupled to a display device, the processor configured to control the system to provide on-demand advertising by,  
receiving advertising information for at least one item along with a broadcast of a program, wherein the at least one item is associated with at least one scene of the program;

displaying an advertising mark for the item on a display along with the associated scene of the broadcasted program, wherein displaying an advertising mark comprises a non-advertisement mode and a stored advertisement mode, the advertising marks being disabled in the non-advertisement mode and the advertising marks being stored before display in the stored advertisement mode; and  
upon selection of the advertising mark by a viewer, displaying the advertising information on the display along with the broadcast of the program.

23. The system of claim 22, wherein the processor is further configured to control the system by:  
storing received advertising information on at least one smart card; and  
storing information on the smart card regarding the associated broadcasted program in association with the advertising information.

24. The system of claim 22, wherein the processor is configured to control the system to alert the viewer by providing at least one alert to a viewer when an advertisement is available for at least one item in a displayed scene, wherein the at least one alert comprises a tone and at least one displayed mark.

25. The system of claim 24, wherein the displayed scene comprises currently displayed scenes, previously displayed scenes, and scenes that are to be displayed in the future.

26. The system of claim 24, wherein the at least one displayed mark is superimposed over the broadcasted program on the display.

27. The system of claim 24, wherein the at least one displayed advertising mark comprises an indicator that the advertising information is available for the at least one item in the displayed scene.

28. The system of claim 24, wherein the at least one displayed mark comprises an indicator for each item for which the advertising information is available, wherein the indicator is representative of the item to which the indicator corresponds.

29. The system of claim 28, wherein the processor is further configured to control the system by receiving a viewer selection of an indicator corresponding to an item and displaying the advertising information associated with the item.

30. The system of claim 22, wherein the stored advertisement mode causes all of the advertising information for the program to be stored, wherein the stored advertising information is recalled and viewed at a time that is different from a display time of a scene in which an advertised item appears.

31. The system of claim 22, wherein the processor is further configured to control the system to display the advertising information using at least one display mode, wherein the at least one display mode is selectable by the viewer, wherein a first display mode of the at least one display mode superimposes the advertising information over the broadcasted program on the display, wherein a second display mode of the at least one display mode displays the advertising information on a portion of the display along with the broadcasted program, wherein the portion of the display is selectable by the viewer.

32. The system of claim 22, wherein the processor is further configured to control the system to control presentation of the advertising information using an electronic program guide.

33. The system of claim 22, wherein the processor is further configured to control the system to store the advertising information for at least one selected item, wherein the advertising information is selected for storage by the viewer.

34. The system of claim 22, wherein the advertising information is received simultaneously with the at least one scene in which the at least one item appears.

35. The system of claim 22, wherein the advertising information is received prior to transmission of the broadcasted program, and wherein the prior received advertising information is stored.

36. The system of claim 35, wherein the processor is further configured to control the system to receive timing data that links the advertising information to the corresponding at least one scene.

37. The system of claim 22, wherein the processor is further configured to control the system to provide at least one electronic link to at least one of a manufacturer and a dealer of the at least one item using the advertising information, wherein the electronic links comprise links to at least one of Web pages and electronic catalogs.

38. The system of claim 22, wherein the processor is further configured to control the system to electronically order the at least one item using the advertising information.

39. The system of claim 22, wherein the processor is further configured to control the system to:

receive coupon information along with the broadcasted program;

alert a viewer when the coupon information is available; and

display the coupon information on a display along with the broadcasted program.

40. A computer readable medium containing executable instructions which, when executed in a processing system, causes the system to perform a method for on-demand advertising, the method comprising:

receiving advertising information for at least one item along with a broadcast of a program, wherein the at least one item is associated with at least one scene of the program; and

displaying an advertising mark for the at least one item on a display along with the associated at least one scene of the broadcasted program, and upon selection of the advertising mark by a viewer, displaying the advertising information on the display along with the broadcasted program,

the medium further comprising a plurality of display modes including a non-advertisement mode and a stored advertisement mode, wherein the stored advertisement mode causes all of the advertising information for the program to be stored, wherein the stored advertising information is recalled and viewed at a time that is different from a display time of a scene in which an advertised item appears.

41. The computer readable medium of claim 40, wherein the method further comprises the steps of:

storing received advertising information on at least one smart card; and

storing information on the smart card regarding the associated broadcasted program in association with the advertising information.

42. The computer readable medium of claim 40, further comprising providing at least one alert to a viewer when advertising information is available for at least one item in a displayed scene, wherein the at least one alert comprises a tone and at least one displayed advertising mark.

43. The computer readable medium of claim 42, wherein the at least one displayed advertising mark is superimposed over the broadcasted program on the display.

44. The computer readable medium of claim 42, wherein the at least one displayed advertising mark comprises an indicator for each item for which the advertising data is available, wherein the indicator is representative of the item to which the indicator corresponds.

45. The computer readable medium of claim 44, wherein the method further comprises receiving a viewer selection of an indicator corresponding to an item and displaying the advertising information associated with the item.

46. The computer readable medium of claim 40, wherein the step of displaying the advertising information comprises superimposing the advertising information over the broadcasted program on the display.

47. The computer readable medium of claim 40, wherein the advertising information is received prior to transmission of the broadcasted program and stored.

48. The computer readable medium of claim 40, wherein the method further comprises the step of controlling pre-

sentation of the advertising information using an electronic program guide.

49. The computer readable medium of claim 40, wherein the method further comprises the step of providing electronic links to at least one manufacturer and at least one dealer of the at least one item using the advertising information, wherein the electronic links comprise links to Web pages and electronic catalogs.

50. The computer readable medium of claim 40, wherein the method further comprises the step of storing advertising information for the at least one items used throughout the corresponding broadcasted program for a prespecified period of time after the program ends.

51. The computer readable medium of claim 40, wherein the method further comprises the step of storing the advertising information for at least one selected item, wherein the advertising information is selected for storage by the viewer.

52. The computer readable medium of claim 47, wherein the method further comprises the step of receiving timing

data that links the advertising information to the corresponding at least one scene.

53. The computer readable medium of claim 40, wherein the method further comprises the step of electronically ordering the at least one item using the advertising information.

54. The computer readable medium of claim 40, wherein the method further comprises the steps of:

receiving coupon information along with the broadcasted program;

alerting a viewer when the coupon information is available; and

displaying the coupon information on a display along with the broadcasted program.



US006668133B2

(12) **United States Patent**  
Yuen et al.

(10) Patent No.: **US 6,668,133 B2**  
(45) Date of Patent: **Dec. 23, 2003**

(51) APPARATUS AND METHOD USING  
COMPRESSED CODES FOR SCHEDULING  
BROADCAST INFORMATION RECORDING

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Hollywood, CA (US)

(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/272,232**

(22) Filed: **Oct. 15, 2002**

(65) **Prior Publication Data**

US 2003/0152367 AI Aug. 14, 2003

**Related U.S. Application Data**

(63) Continuation of application No. 09/374,137, filed on Aug. 10, 1999, now Pat. No. 6,466,734, which is a division of application No. 08/48,533, filed on Aug. 28, 1997, now Pat. No. 5,974,222, which is a continuation of application No. 08/327,148, filed on Oct. 12, 1994, now abandoned, which is a continuation-in-part of application No. 07/981,152, filed on Dec. 1, 1991, now abandoned, which is a continuation-in-part of application No. 07/764,934, filed on Mar. 27, 1991, now Pat. No. 5,335,079, which is a continuation-in-part of application No. 07/371,054, filed on Jun. 26, 1990, now abandoned, which is a continuation-in-part of application No. 07/289,369, filed on Dec. 23, 1990, now abandoned.

(51) Int. Cl. **7** ..... **H04N 5/91; H04N 7/26**

(52) U.S. Cl. ..... **386/83; 386/109**

(58) **Field of Search** ..... **386/83, 109, 111,  
386/112, 46, 52, 92-4; 725/86, 87, 101,  
102; H04N 5/91, 7/26**

(56) **References Cited**  
U.S. PATENT DOCUMENTS

4,977,455 A \* 12/1990 Young  
5,335,079 A 8/1994 Yuen et al.  
5,300,027 A \* 2/1995 Heini et al.  
5,515,173 A 5/1996 Mankovitz et al.  
6,166,734 B2 \* 10/2002 Yuen et al.

\* cited by examiner

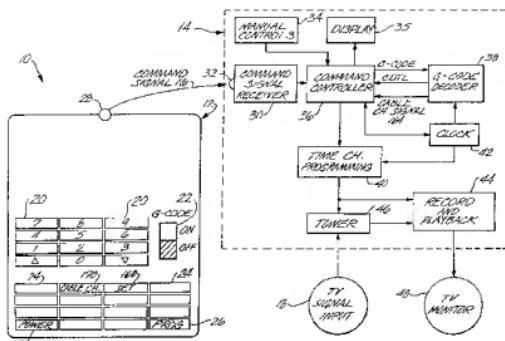
*Primary Examiner*—Robert Chevalier

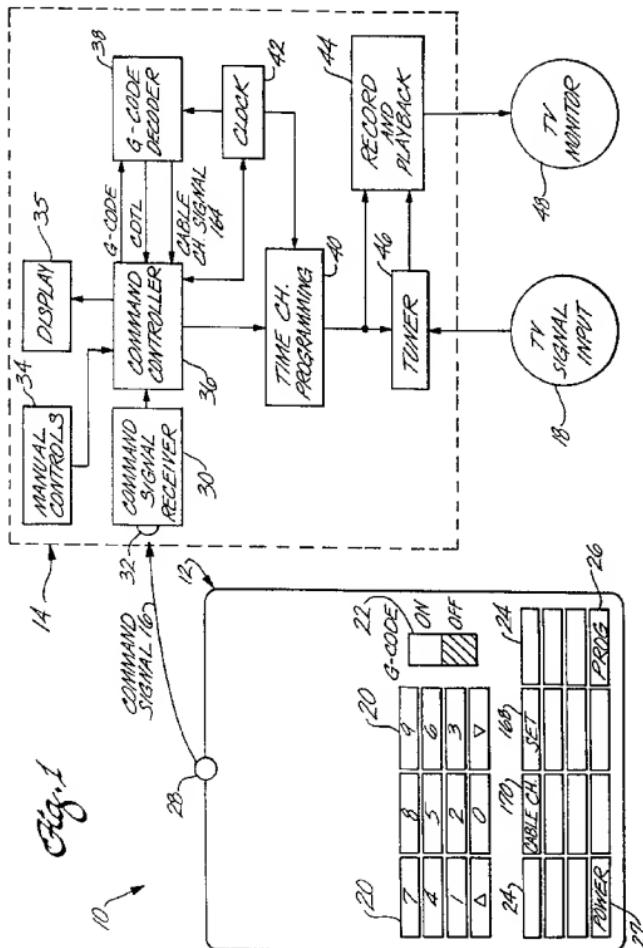
(74) *Attorney, Agent, or Firm*—Christie, Parker & Hale,  
LLP

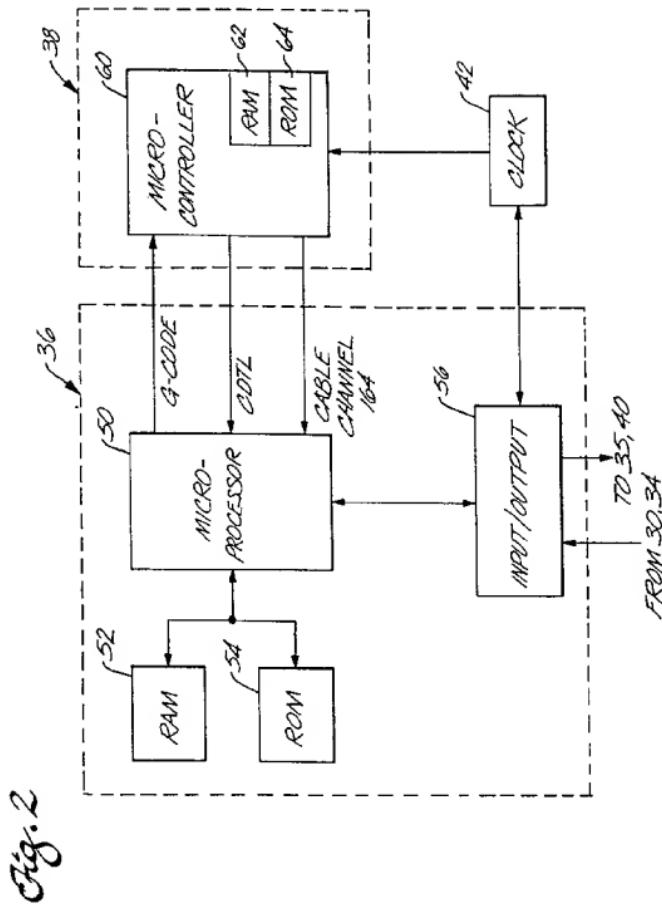
(57) **ABSTRACT**

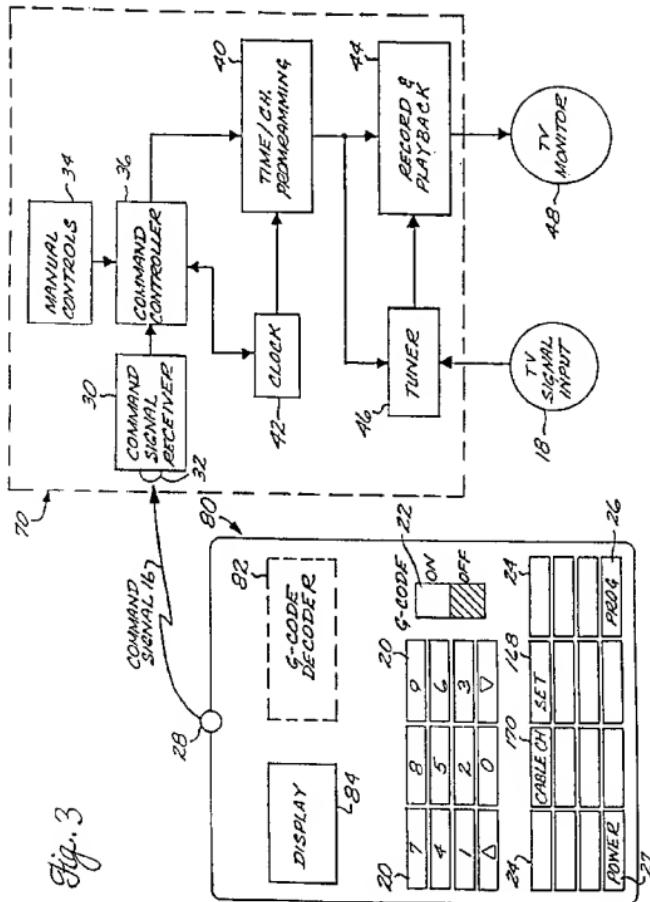
Digital compressed codes, associated with advertisements enable a user to selectively record additional information, which would be broadcast on a television channel at a later time. The advertisement could be print advertisement or broadcast advertisement on television or radio. The user encodes the digital code (I code) associated with an advertisement into a unit with a decoding means which automatically converts the code into CTL (channel, time and length). The unit within a twenty four hour period activates a VCR to record information on the television channel at the right time for the proper length of time. The decoded channel, time and length information can be communicated directly to a VCR and used by the VCR directly to automatically activate the VCR to record a given television information broadcast corresponding to the communicated channel, time and length. Alternatively, the channel, time and length information can be decoded directly in a remote control unit and only start record, stop record and channel selection commands sent to the VCR at the appropriate times. Algorithms for decoding the I codes can be a function of time to ensure security of the decoding method. A method is included for use of the I codes with cable channels.

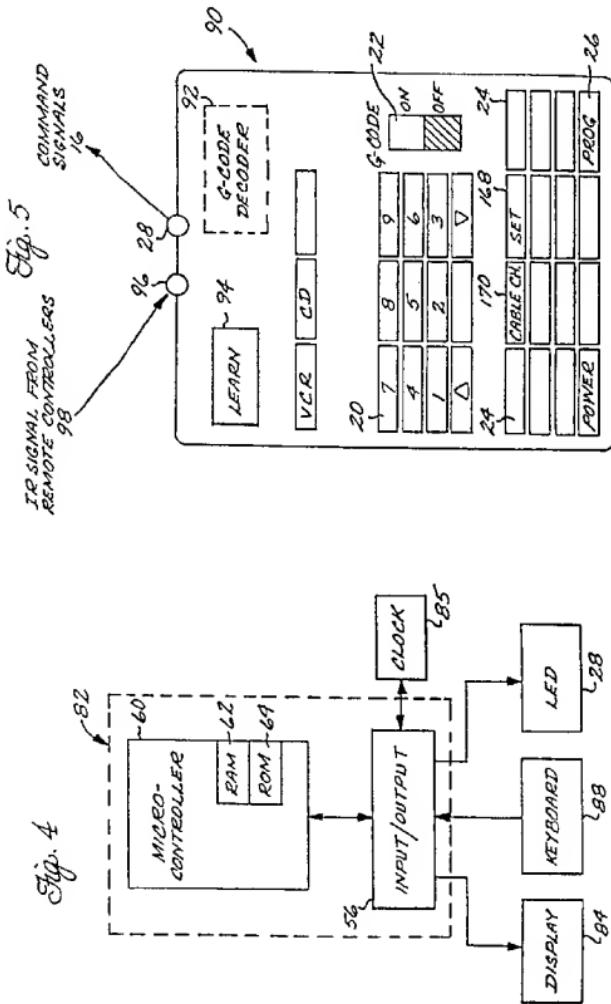
43 Claims, 29 Drawing Sheets

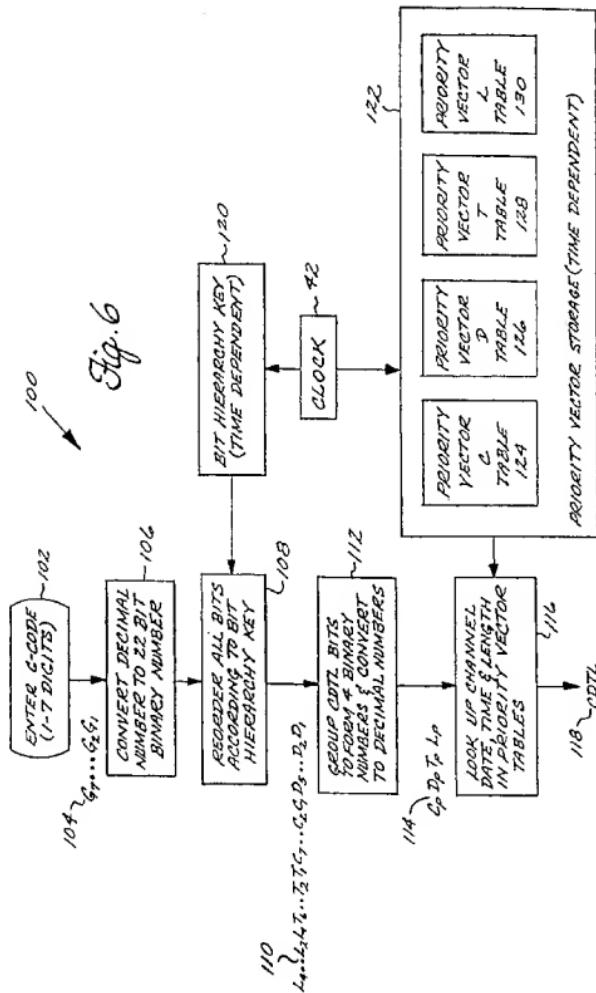


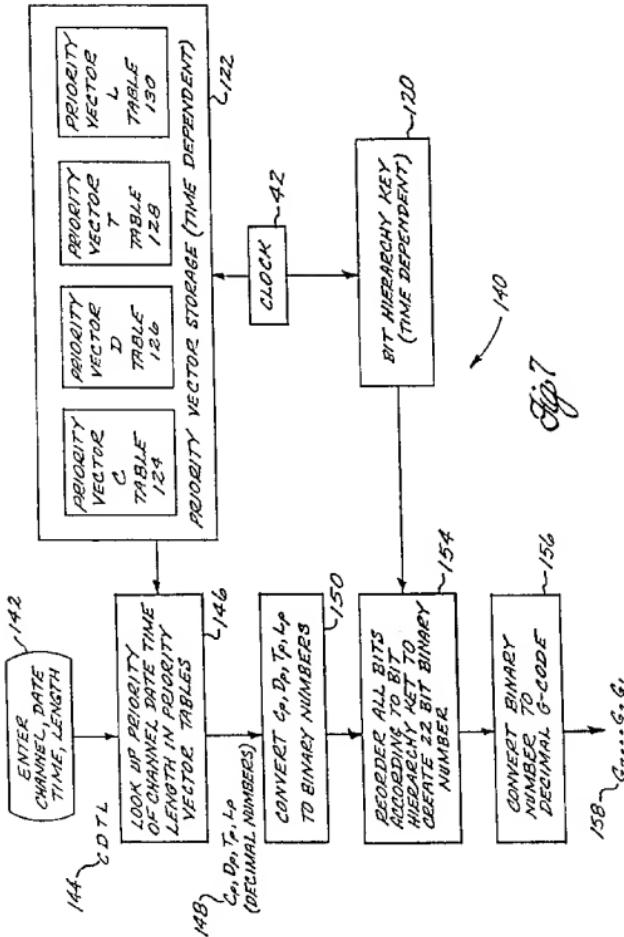












THURSDAY-204

FEBRUARY 9, 2007-202

308-10 SPORTS RETROSPECTIVE: 60 MIN. [687137]  
 6PM 24 NATURESCENE [5321]  
 206 A VISIT TO THE COLORADO NATIONAL MONUMENT  
 NEAR GRAND JUNCTION WHERE WILD FLOWERS,  
 INSECT AND BIRDS ARE OBSERVED  
 210

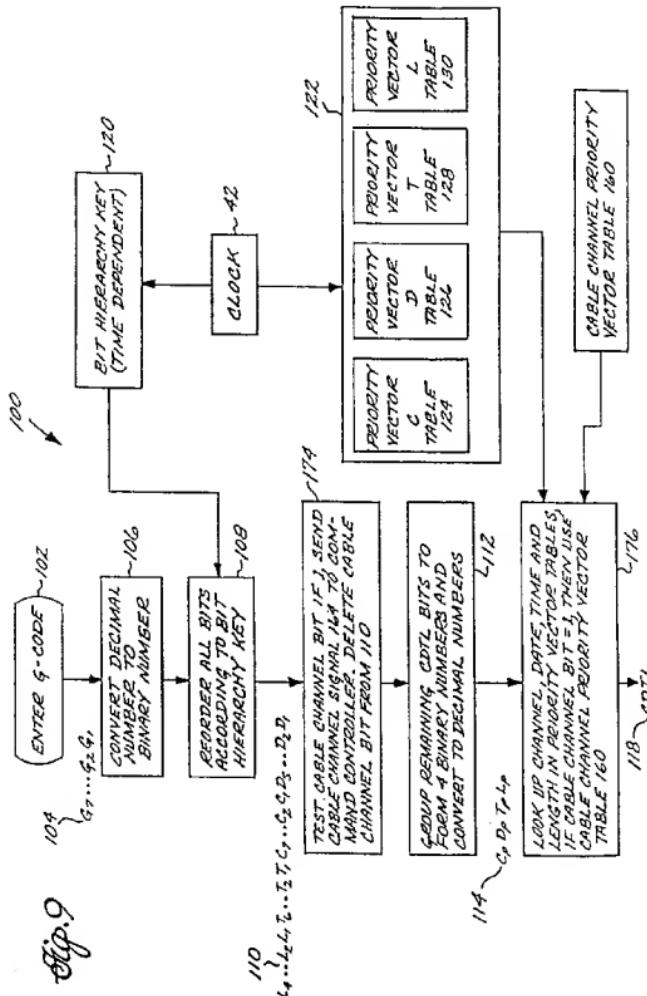
34 [52] NOTICIAS [2921] [906649]  
 40 DWIGHT THOMPSON--RELIGION; [685537]  
 50 HUMANITIES THROUGH THE ARTS [903065]  
 56 BEVERLY HILLBILLIES--COMEDY [906717]

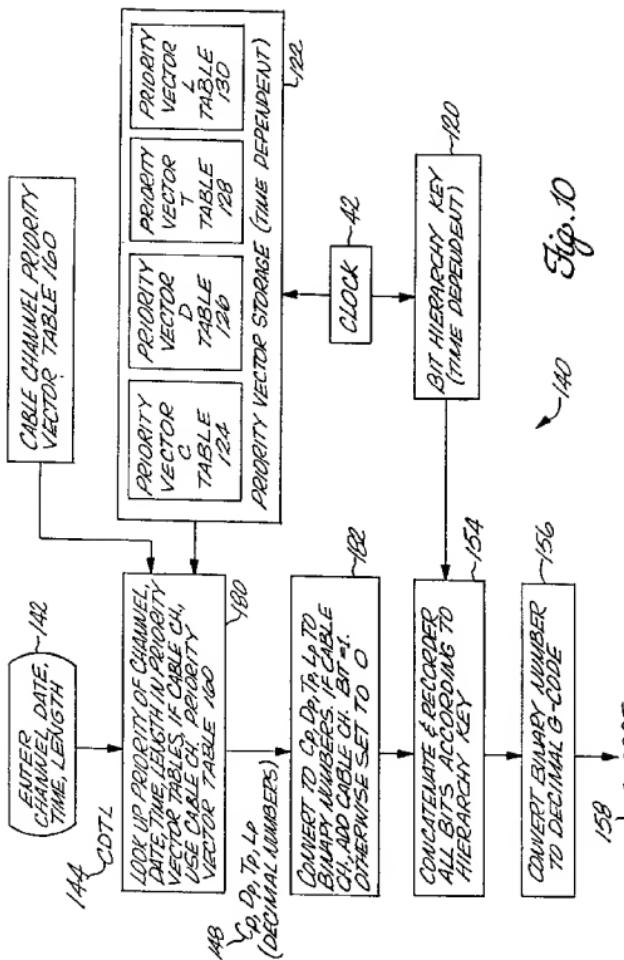
FRIDAY-204

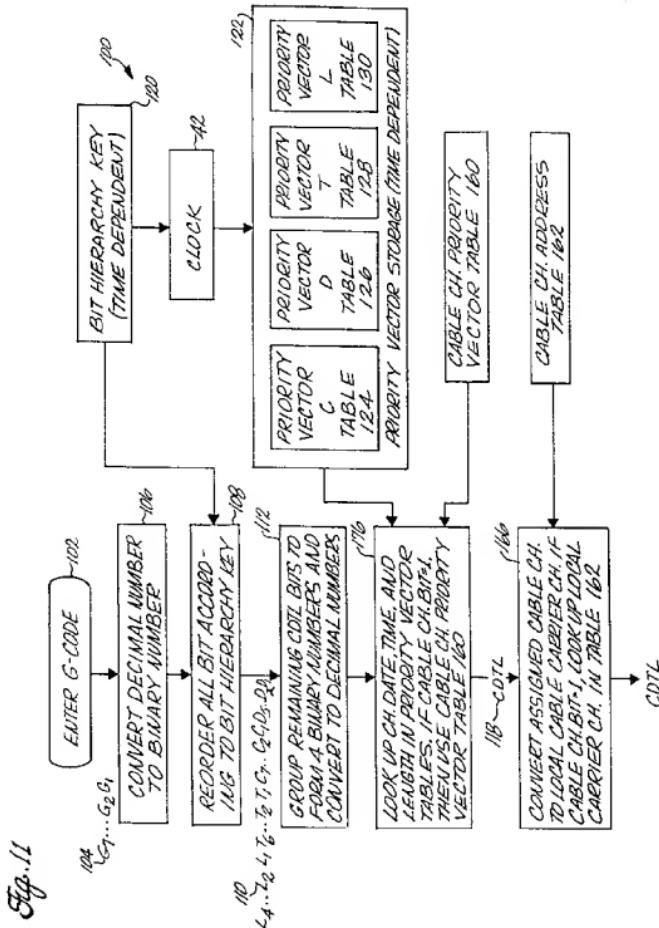
FEBRUARY 10, 2007-202

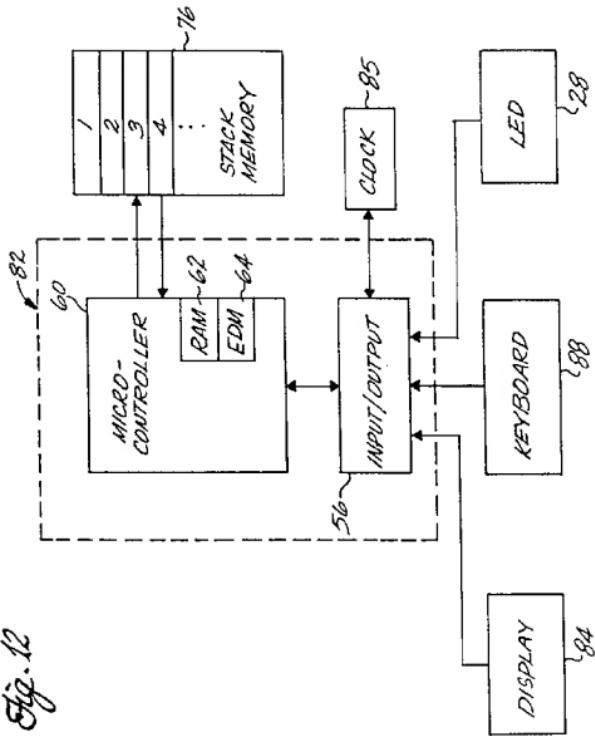
CB [D5] MOVIE--DRAMA; 70 MIN. [2362713]  
 6:30 17 FAMILY TIES (CC) - COMEDY [55657]  
 206 MALLORY'S REUNION WITH HER COLLEGE BOY FRIEND 200  
 (JOHN DURAKY) HAS AEP WORRIED THAT SHE MAY  
 NOT BE AS INTERESTING TO HIM AS SHE ONCE WAS.  
 208-156 HOBANS HEROES - COMEDY [510857]  
 188 CARET'S MASQUEURADE AS A TRAITOR MAY BE  
 KARUT: A LOVELY FRAULEIN IS TRYING TO POISON HIM  
 CB UK DOUBLE DARE-GAME [202225]-212  
 CII THAI VIDEODCOUNTRY [29/29]  
 CII USA CARTOON EXPRESS [23561]  
 1704 3 CHARLES IN CHARGE (CC) - COMEDY [6057]  
 1704 3 WHILE PLANNING A PIZZA-PARLOR PARTY, CHARLES  
 ALIENATES THE POWELL CHILDREN BY DISMISSING  
 THEIR SUGGESTIONS ABOUT ORGANIZING THE EVENT.

Step 8









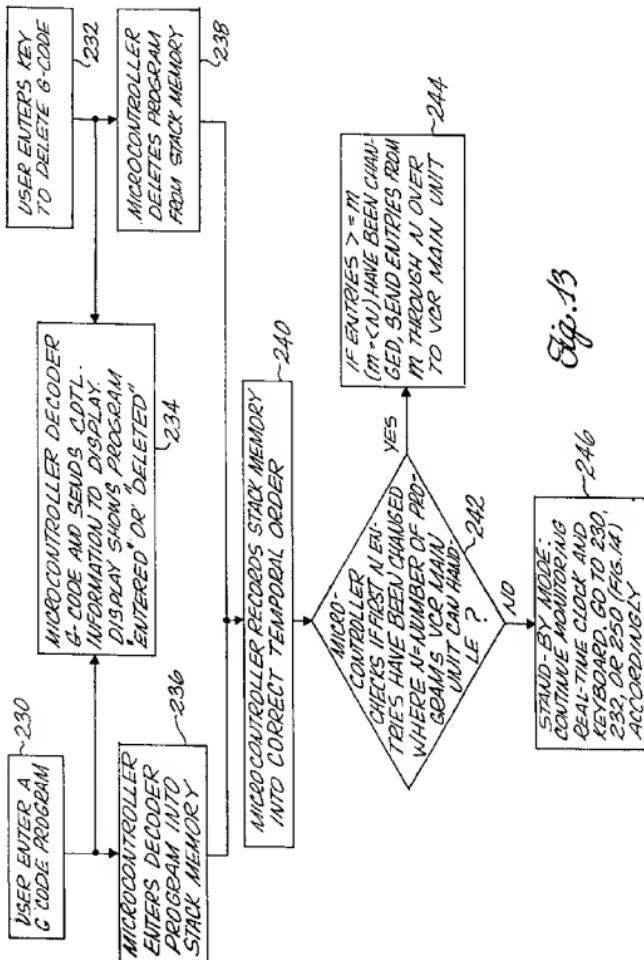
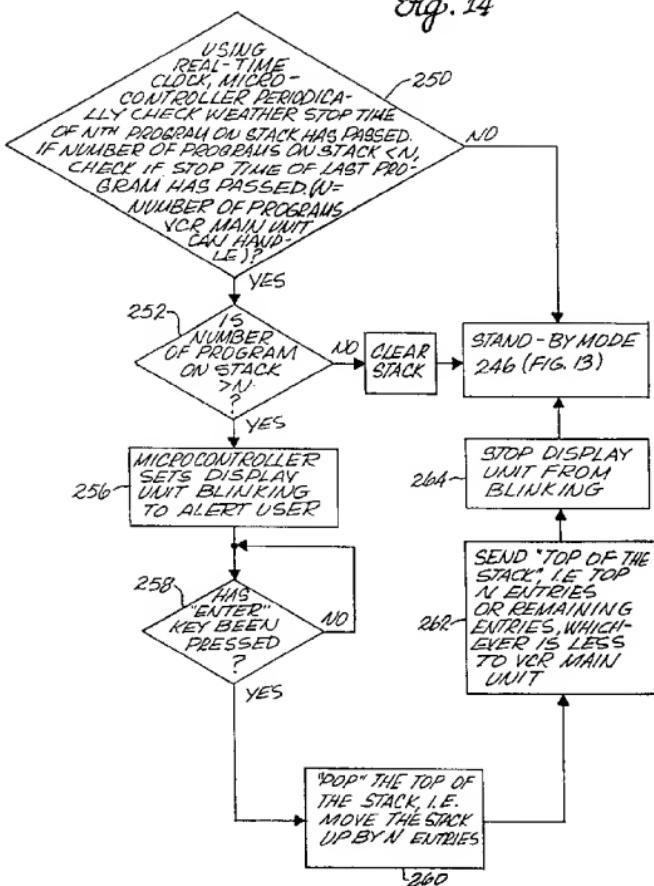


Fig. 14



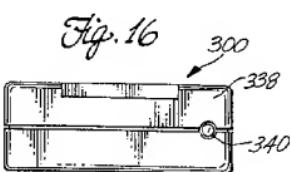
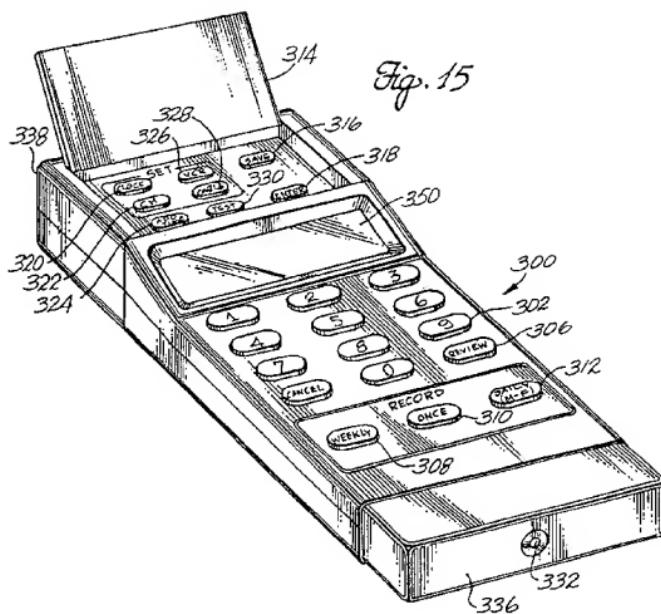


Fig. 17

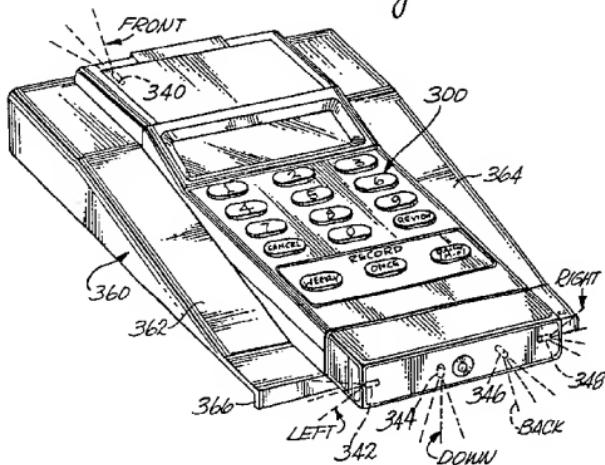


Fig. 18

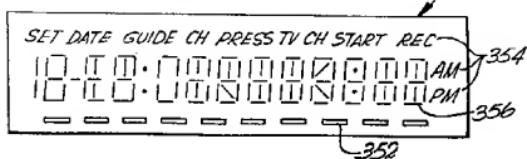


Fig. 19

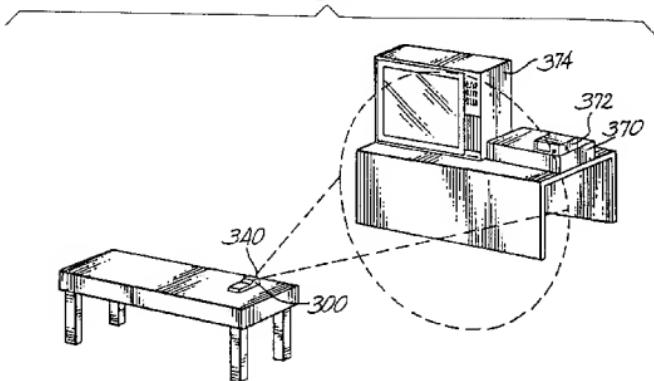


Fig. 20

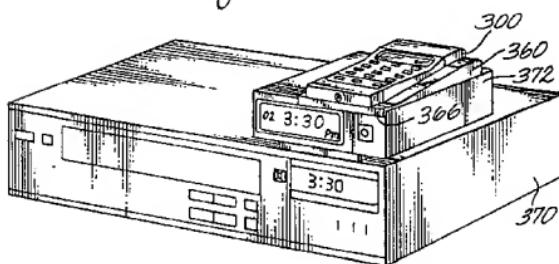


Fig. 21

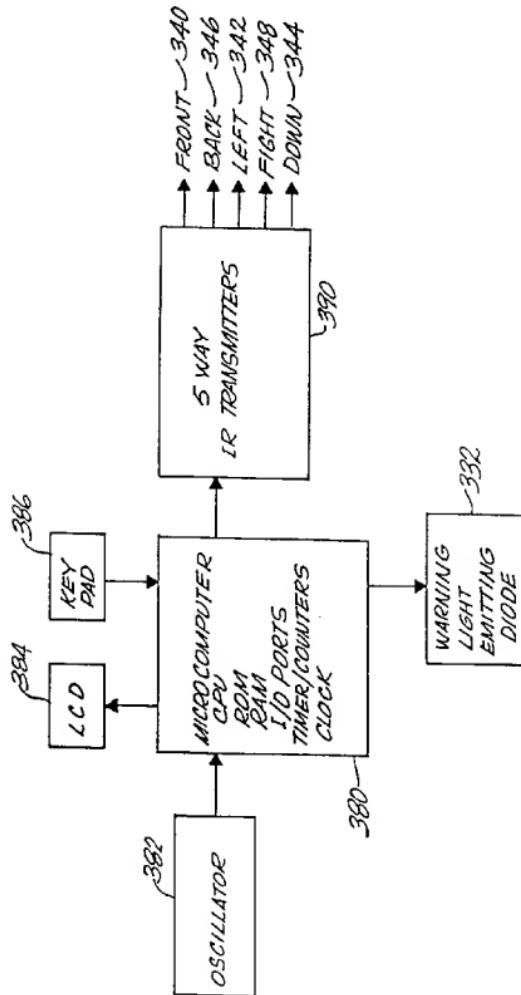
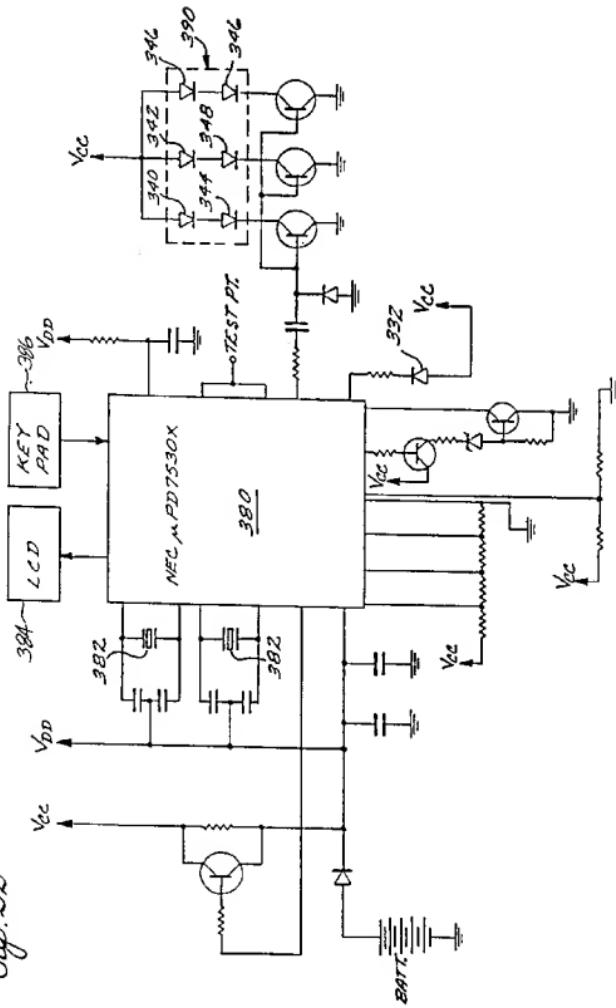


Fig. 22



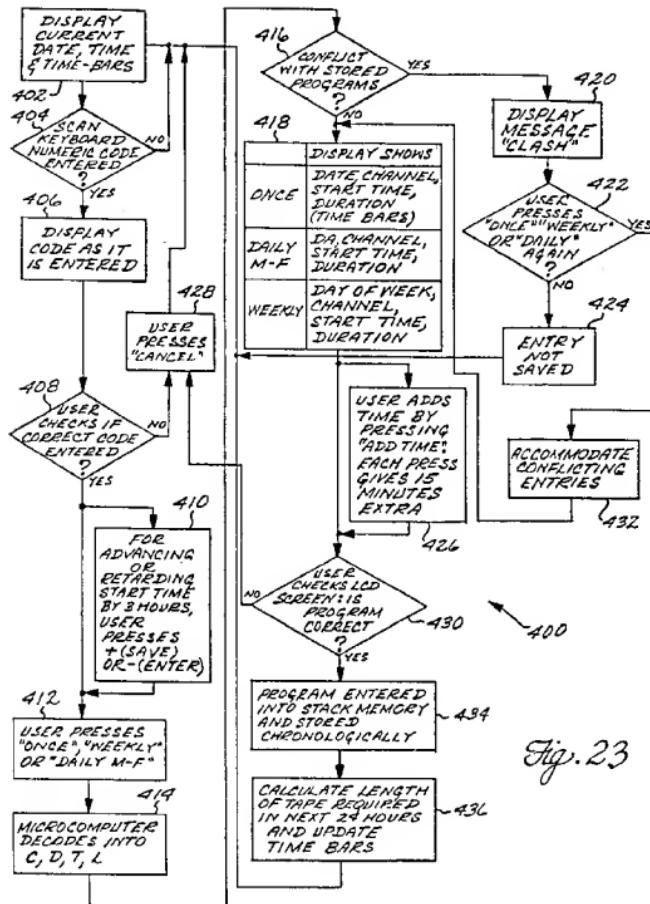
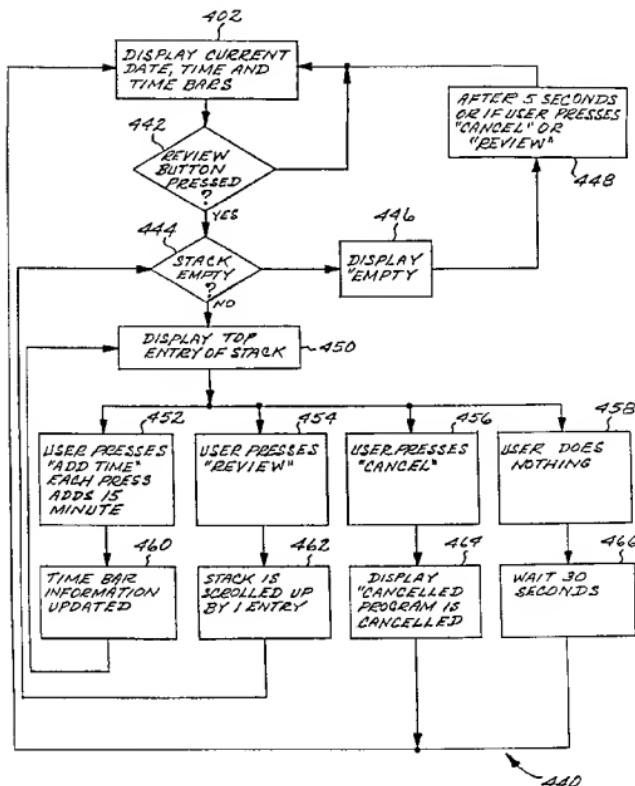


Fig. 23

Fig. 24



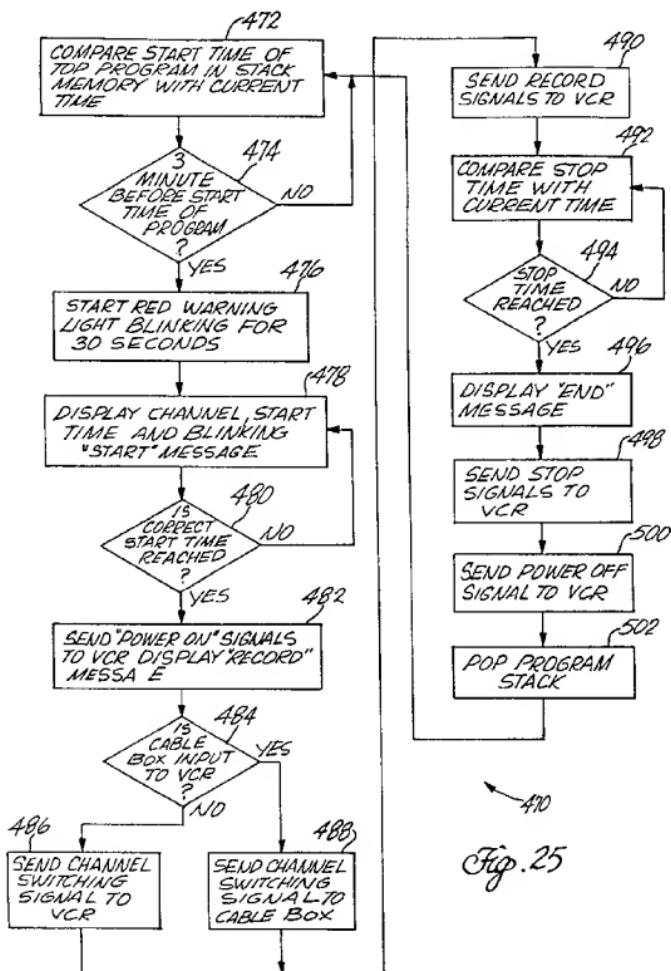
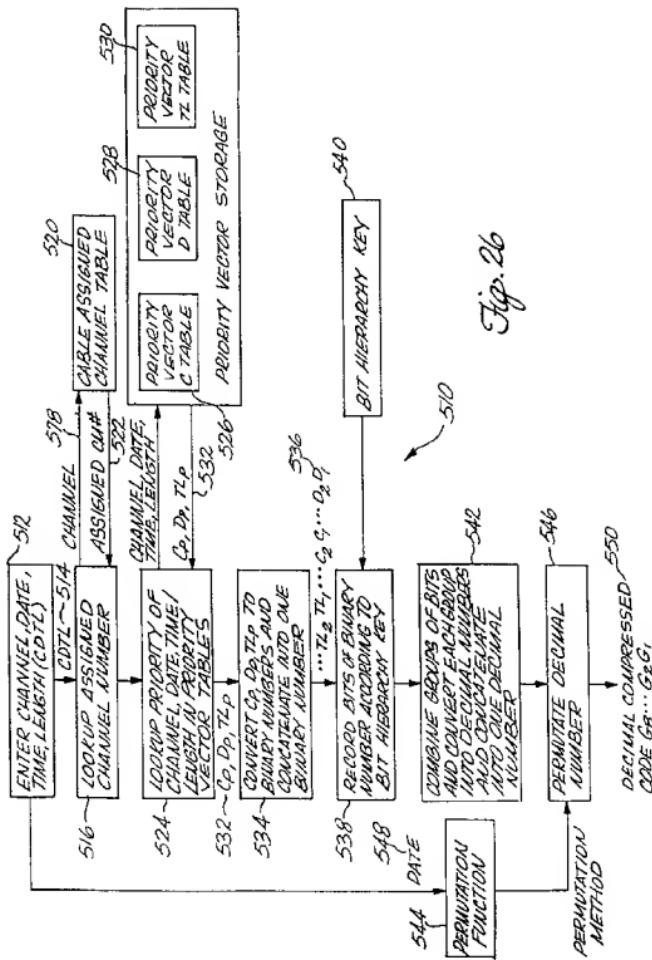
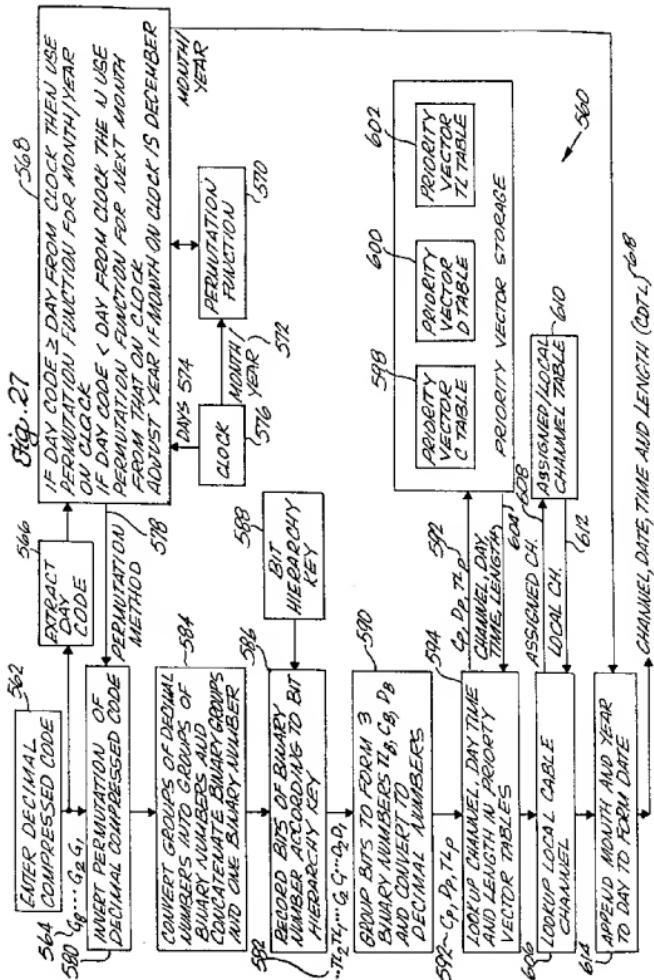


Fig. 25





*Fig. 28*

	ASSIGNED CHANNEL NUMBERS	LOCAL CHANNEL NUMBERS
	GUIDE CH.	TV CH.
<i>BROADCAST CHANNELS</i>		
WBBM (CBS)	2	2
WMAQ (NBC)	5	5
622-WLS (ABC)	7	7
WGN	9	9
WTTW (PBS)	11	16
WPWR	50	45
WGBO	66	48
<i>CABLE CHANNELS</i>		
A&E	10	10
632-AMC	4	4
BET	25	8
BRAV	24	29
CNCB	36	36
CNN	13	35
CSPAN	27	30
D19	23	25
ESPN	3	6

628

620

626

630

Fig. 29A

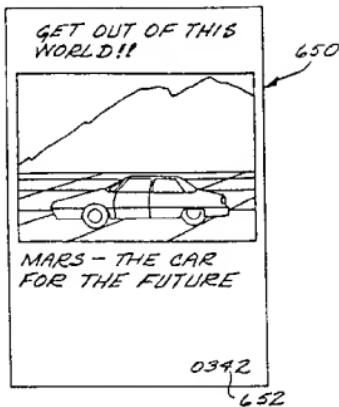
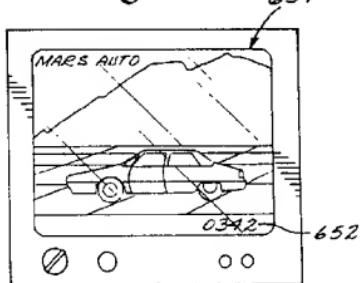


Fig. 29B



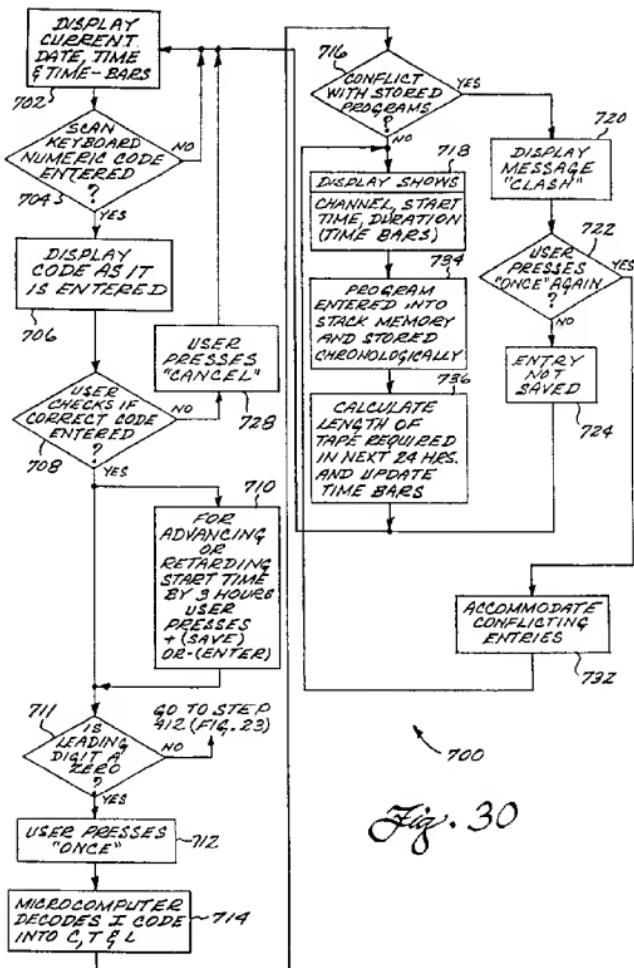


Fig. 31

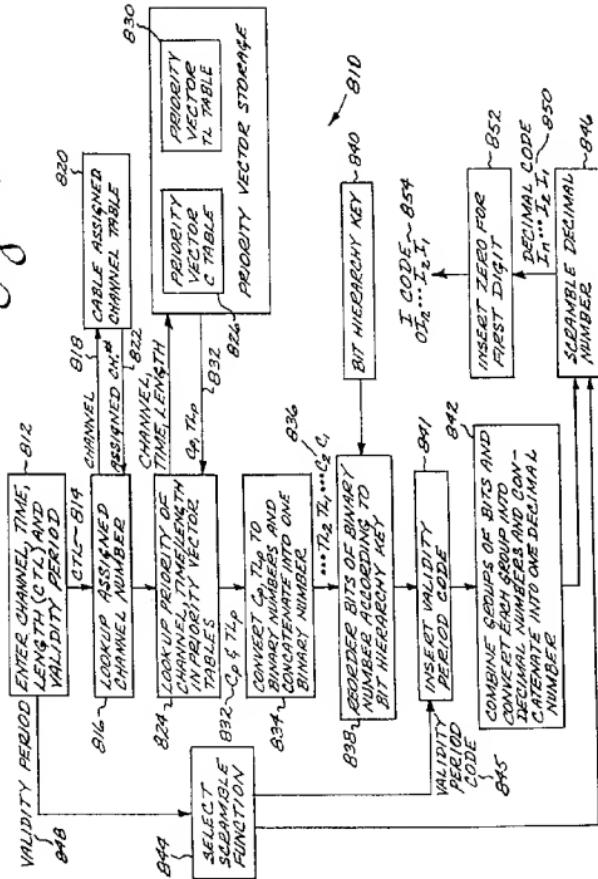


Fig. 32

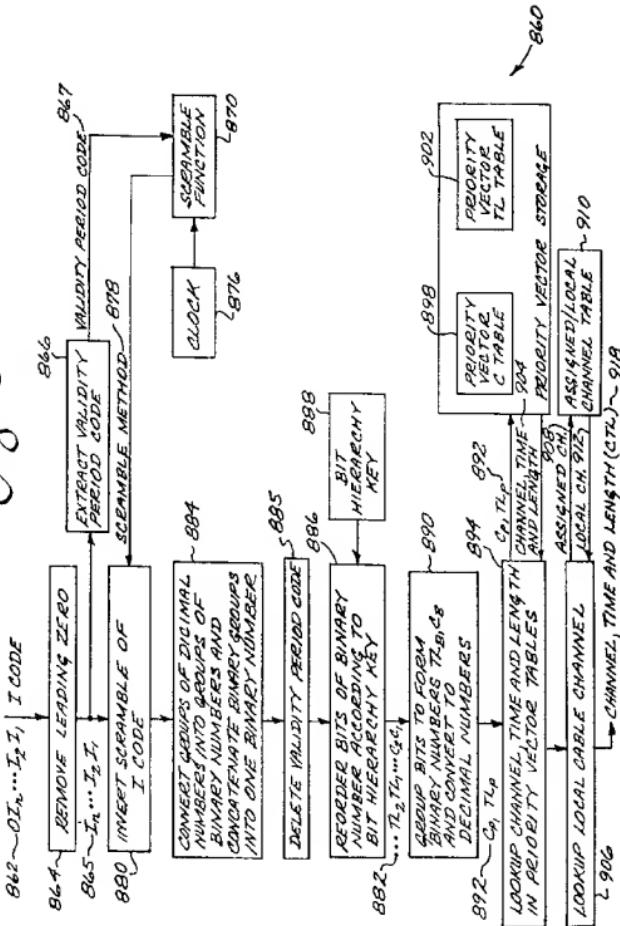
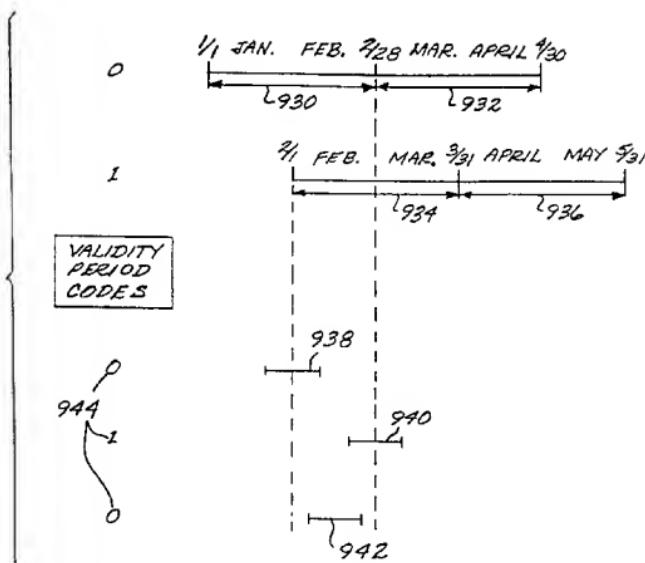


Fig. 33



APPARATUS AND METHOD USING  
COMPRESSED CODES FOR SCHEDULING  
BROADCAST INFORMATION RECORDING

CROSS-REFERENCE TO RELATED  
APPLICATIONS

This is a continuation of U.S. patent application Ser. No. 09/374,137 filed Aug. 10, 1999, now U.S. Pat. No. 6,466,734, which is a divisional of U.S. patent application Ser. No. 08/848,533 filed on Aug. 28, 1997, issued as U.S. Pat. No. 5,974,222, which is a continuation of U.S. patent application Ser. No. 08/327,140 filed on Oct. 20, 1994 (abandoned), which is a continuation of U.S. patent application Ser. No. 07,806,152 filed on Dec. 11, 1991 (abandoned), which is continuation in part of U.S. patent application Ser. No. 07,676,934 filed Mar. 27, 1991, issued as U.S. Pat. No. 5,335,079, which is a continuation in part of U.S. patent application Ser. No. 07/371,054 filed Jun. 26, 1989 (abandoned), which itself is a continuation in part of Ser. No. 07/289,369, filed Dec. 23, 1988 (abandoned), each of which is incorporated by reference as if set forth herein in full.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to video cassette recorder systems and particularly to the timer preprogramming feature of video cassette recorders (VCRs) and to an apparatus and method for using encoded information to shorten the time required to perform timer preprogramming and also an apparatus and method for enabling a user to selectively record, for later viewing, detailed information that is associated with an earlier publication or broadcast of an advertisement.

2. Prior Art

The video cassette recorder (VCR) has a number of uses, including playing back of tapes filmed by a video camera, playing back of pre-recorded tapes, and recording, and playing back of broadcast and cable television programs.

To record a television program in advance of viewing it, a two-step process is often used: (1) obtain the correct channel, date, time and length (CDTL) information from a television program guide, and (2) program this CDTL information into the VCR. Depending on the model, year and type of the VCR, the CDTL information can be programmed in various ways including: (i) pushing an appropriate sequence of keys in the console according to instructions contained in the user's manual, (ii) pushing an appropriate sequence of keys in a remote hand-held control unit according to instructions contained in the user's manual (remote programming), and (iii) executing a series of keystrokes in the remote hand-held control unit in response to a menu displayed on the television screen (on-screen programming). Other techniques for timer preprogramming have been suggested including, (iv) reading in certain bar-code information using a light pen (light pen programming), and (v) entering instructions through a computer or telephone modem. These various methods differ only in the physical means of specifying the information while the contents, being CDTL and certain power/clock/timer on-off commands are generally common although the detailed protocol can vary with different model VCRs. Methods (i) and (ii) described above can require up to 100 keystrokes, which has inhibited the free use of the timer preprogramming feature of VCRs. To alleviate this, new VCR models have included an "On-Screen Programming" feature, which permits remote input of CDTL information in response to a menu displayed

on the television screen. Generally on screen programming of CDTL information requires an average of about 18 keystrokes, which is less than some of the prior methods but still rather substantial. Some of the other techniques such as (iv) above, require the use of special equipment such as a bar code reader.

In general the present state of the art suffers from a number of drawbacks. First, the procedure for setting the VCR to record in advance can be quite complex and confusing and difficult to learn; in fact, because of this many VCR owners shun using the timer preprogramming record feature. Second, the transcription of the CDTL information to the VCR is hardly ever error-free; in fact, many users of VCR's timer preprogramming features express concern over the high incidence of programming errors. Third, even for experienced users, the process of entering a lengthy sequence of information on the channel, date, time and length of desired program can become tedious. Fourth, techniques such as reading in bar-code information or using a computer require special equipment. These drawbacks have created a serious impedance in the use of a VCR as a recording device for television programs. The effect is that time shifting of programs has not become as popular as it once was thought it would be. Accordingly, there is a need in the art for a simpler system for effecting VCR timer preprogramming which will enable a user to take advantage of the recording feature of a VCR more fully and freely.

The prior art in the area of enabling a user to selectively record for later viewing, detailed information associated with an advertisement is the familiar advertisement by a network during a television channel commercial break that there will be "news at 11" or that there will be an "interview with the winning coach at 9". A viewer watching the channel that sees/hears this announcement could program his VCR to record the "news" or "interview" at the appropriate time. Thus, the concept of having a cue broadcast simultaneously with an advertisement that alerts a user that supplemental information regarding the advertisement will be broadcast at a later time can be implemented easily with standard apparatus such as a television and a VCR and is not new to the state of the art. The user could also be informed of an "interview with the winning coach" through print advertisement, which would indicate the channel time and date of the interview. When the user is informed either through a broadcast or a printed advertisement that a winning team's coach will be interviewed later that day, the viewer uses his standard remote controller to program his VCR to automatically record this later program. The VCR stores the schedule information from the controller and, via its display panel, provides acknowledgment to the user of his programming commands.

U.S. Pat. No. 4,977,455 for a System and Process for VCR Scheduling discloses a television broadcast system in which a cue is broadcast and displayed simultaneously with a primary program. The cue alerts a user that supplemental information regarding the primary program will be broadcast at a later time. If the user responds to the cue via a remote controller, then data embedded in the primary program broadcast during the video blanking interval segment of the video signal, but not visible to the viewer, will be automatically stored and interpreted by a microprocessor and used to control a VCR to record the supplemental broadcast at the later time. Young does not contemplate the use of printed media at all and requires that a special unit be associated with the television receiver to store and interpret the data embedded in the primary program broadcast, and also to respond to the user cue, for the system to work at all,

even for television advertisements, as shown in elements 4, 5, 9, 10, and 15 of FIG. 1, of U.S. Pat. No. 4,977,455.

#### SUMMARY OF THE INVENTION

A principal object of the invention is to provide an improved system for the selection and entering of channel, date, time and length (CDTL) information required for timer preprogramming of a VCR which is substantially simpler, faster and less error-prone than present techniques. Another principal object of the invention is to provide an improved apparatus and method for enabling a user to selectively record, for later viewing, detailed information that is associated with an earlier publication or broadcast of an advertisement.

In accordance with the invention, to program the timer preprogramming feature of a video system, there is an apparatus and method for using encoded video recorder/player timer preprogramming information. The purpose is to significantly reduce the number of keystrokes required to set up the timer preprogramming feature on a VCR. In accordance with this invention it is only necessary for the user to enter a code with 1 to 7 digits or more into the VCR. This can be done either remotely or locally at the VCR. Built into either the remote controller or the VCR is a decoding means which automatically converts the code into the proper CDTL programming information and activates the VCR to record a given television program with the corresponding channel, date, time and length. Generally multiple codes can be entered at one time for multiple program selections. The code can be printed in a television program guide in advance and selected for use with a VCR or remote controller with the decoding means.

Another principal object of the invention is to enable a user to selectively record information designated by a digital code, which would be associated with an advertisement. The advertisement could be print advertisement or a broadcast advertisement on television or radio. The additional information could be broadcast on a television channel early in the morning, for example, between midnite and six o'clock in the morning, when the broadcast rates are low and it is economical to broadcast detailed information or advertisements of many items, especially expensive ones, such as automobiles and real estate. In accordance with this invention it is only necessary for the user to enter a digital compressed code associated with an advertisement into a unit with a decoding means which automatically converts the code into CDTL (channel, time and length). The unit activates a VCR to record information on the television channel starting at the right time and recording for the proper length of time. The information will be recorded within the next twenty four hours so it is not necessary to decode any date. The user can then view this information at his/her leisure.

Other objects and many of the attendant features of this invention will be more readily appreciated as the same becomes better understood by reference to the following detailed descriptions and considered in connection with the accompanying drawings in which like reference symbols designate like parts throughout the figures.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic showing apparatus according to this invention with the code decoder means embedded in the video cassette recorder;

FIG. 2 is a schematic of the VCR embedded processors for command control and code decoding;

FIG. 3 is a schematic showing a preferred embodiment according to this invention with the code decoder means embedded in a remote controller;

FIG. 4 is a schematic of the processor embedded in the remote controller;

FIG. 5 is a schematic of a universal remote controller with the code decoder means embedded in the universal remote controller;

FIG. 6 is a flow graph of the G-code decoding technique;

FIG. 7 is a flow graph of the G-code encoding technique;

FIG. 8 is an illustration of part of a television calendar according to this invention;

FIG. 9 is a flowchart for decoding for cable channels;

FIG. 10 is a flowchart for encoding for cable channels;

FIG. 11 is a flow graph of the G-code decoding for cable channels including conversion from assigned cable channel number to local cable carrier channel number;

FIG. 12 is a means for decoding including a stack memory;

FIG. 13 is a flowchart for program entry into stack memory;

FIG. 14 is an operation flowchart for sending programs from remote control to main unit VCR;

FIG. 15 is a perspective view of an apparatus for using compressed codes for recorder preprogramming according to a preferred embodiment of the invention;

FIG. 16 is a front view of the apparatus of FIG. 15 showing a forward facing light emitting diode;

FIG. 17 is a perspective view of the apparatus of FIG. 15 placed in a mounting stand;

FIG. 18 is a detail of the LCD display of the apparatus of FIG. 15;

FIG. 19 is a perspective view showing a manner of placing the apparatus of FIG. 15 relative to a cable box and a VCR;

FIG. 20 is a perspective view showing a manner of placing the mounting stand with the apparatus of FIG. 15 mounted thereon near a cable box and VCR;

FIG. 21 is a schematic showing apparatus for using compressed codes for recorder preprogramming according to a preferred embodiment of the invention;

FIG. 22 is a detailed schematic showing a preferred embodiment of apparatus implementing the schematic of FIG. 21;

FIG. 23 is a flow graph for program entry into the apparatus of FIG. 15;

FIG. 24 is a flow graph for review and program cancellation of programs entered into the apparatus of FIG. 15;

FIG. 25 is a flow graph for executing recorder preprogramming using compressed codes according to a preferred embodiment of the invention;

FIG. 26 is a flow graph for encoding program channel, date, time and length information into decimal compressed codes;

FIG. 27 is a flow graph for decoding decimal compressed codes into program channel, date, time and length information;

FIG. 28 is an embodiment of an assigned channel number/local channel number table;

FIGS. 29a and 29b are examples of a printed advertisement and a television broadcast advertisement showing the use of a decimal code for information (1 code);

FIG. 30 is a flow graph for entry of an I code into the apparatus of FIG. 15;

FIG. 31 is a flow graph for encoding channel, time and length (CDT) into an I code;

FIG. 32 is a flow graph for decoding an I code channel, time and length (CDT); and

FIG. 33 illustrates the relationship of time spans and validity period codes.

#### DESCRIPTION OF THE PRL/ERRLD EMBODIMENTS

Referring now to the drawings, and more particularly, to FIG. 1, there is shown an apparatus for using encoded video recorder/player timer preprogramming information 10 according to this invention. The primary components include a remote controller 12 and a video cassette recorder/player with G-code decoder 14, which can be controlled by remote controller 12 via a command signal 16. The remote controller 12 can have a number of keys, which include numerical keys 20, G-code switch 22, function keys 24, program key 26 and power key 27. There are means in the remote controller 12 that intercepts each key as it is pressed and sends the proper command signal 16 to the VCR via an infra-red light emitting diode 28. Except for the G-code switch 22 on the remote controller 12 in FIG. 1, the remote controller 12 is essentially the same as any other remote controller in function. The G-code switch 22 is provided just to allow the user to lock the remote controller 12 in the G-code mode while using a G-code, which is the name given to the compressed code which is the encoded CDTI information, to perform timer preprogramming.

A G-code consists of 1 to 7 digits, although more could be used, and is associated with a particular program. A user would lookup the G-code in a program guide and just enter the G-code on the remote controller 12, instead of the present state of the art, which requires that the user enter the actual channel, date, time and length (CDT) commands.

In order to understand the advantages of using a G-code, it is helpful to describe the best of the current state of the art, which is "on screen programming" with direct numerical entry. This technique involves about 18 keystrokes and the user has to keep switching his view back and forth between the TV screen and the remote controller while entering the CDTI information. This situation may be akin to a user having to dial an 18 digit telephone number while reading it from a phone book. The number of keys involved and the switching back and forth of the eye tend to induce errors. A typical keying sequence for timer recording using on-screen CDTI programming is as follows:

PROG 2 1 15 07 30 2 08 00 2 04 PROG

The first program (PROG) key 26 enters the programming mode. Then a sequence of numericals key 20 are pushed. The 2 means it is timer recording, rather than time setting. The 1 means the user is now entering the settings for program 1. The 15 is the date. The 07 is starting hour. The 30 is a starting minute. The 2 means pm. The next sequence 08 00 2 is the stopping time. The 04 is channel number. Finally, the PROG is hit again to exit the program mode.

By contrast, this command could have been "coded" and entered in a typical G-code sequence as follows: PROG 1138 PROG. To distinguish that the command is a coded G-code, the G-code switch 22 should be turned to the "ON" position. Instead of having a switch, a separate key "G" can be used. The G-code programming keystroke sequence would then be: G 1138 PROG

The use of a G-code does not preclude "on-screen" confirmation of the program information that has been

entered. When the keystrokes "PROG 1138 PROG" are entered with the G-code switch in the "ON" position, the G-code would be decoded and the television could display the following message:

PROGRAM	DATE	START TIME	STOP TIME	CHANNEL
1138	5	7:30 PM	8:00 PM	4

In order for the G-code to be useful it must be decoded and apparatus for that purpose must be provided. Referring to FIG. 1, a video cassette recorder/player with G-code decoder 14 is provided to be used in conjunction with remote controller 12. The command signal 16 sent from the remote controller 12 is sensed by the photodiode 32 and converted to electrical signals by command signal receiver 30. The electrical signals are sent to a command controller 36, which interprets the commands and determines how to respond to the commands.

As shown in FIG. 1, it is also possible for the command controller 36 to receive commands from the manual controls 34 that are normally built into a VCR. If the command controller 36 determines that a G-code was received then the G-code will be sent to the G-code decoder 38 for decoding.

The G-code decoder 38 converts the G-code into CDTI information, which is used by the command controller 36 to set the time/channel programming 40. Built into the VCR is a clock 42. This is normally provided in a VCR and is used to keep track of the date and time. The clock 42 is used primarily by the time/channel programming 40 and the G-code decoder 38 functions. The time/channel programming 40 function is set up with CDTI information by the command controller 36. When the proper date and time is read from clock 42, then the time/channel programming 40 function turns the record/playback 44 function

"ON" to record. At the same time the tuner 46 is tuned to the proper channel in the television signal 18. Later the user can command the record/playback 44 function to a playback mode to watch the program via the television monitor 48.

An alternate way to control the recorder is to have the command controller 36 keep all the CDTI information instead of sending it to the time/channel programming 40. The command controller would also keep track of the time by periodically reading clock 42. The command controller would then send commands to the time/channel programming 40 to turn on and off the recorder and to tuner 46 to cause it to tune to the right channel at the right time according to the CDTI information.

The clock 42 is also an input to G-code decoder 38, which allows the G-code decoding to be a function of the clock, which lends a measure of security to the decoding technique and makes it harder to copy. Of course this requires that the encoding technique must also be a function of the clock.

A possible realization of the command controller 36 and the G-code decoder 38 is shown in FIG. 2. The command controller 36 function can be realized with a microprocessor 50, a random access memory 52 and a read only memory 54, which is used for program storage. The input/output 56 function is adapted to receive commands from the command signal receiver 30, the manual controls 34 and the clock 42, and to output signals to a display 35, the clock 42, and the time/channel programming 40 function. If the microprocessor 50 interprets that a G-code has been received, then the G-code is sent to microcontroller 60 for decoding. The microcontroller 60 has an embedded random access memory 62 and an embedded read only memory 64 for program and table storage. The clock 42 can be read by both microprocessor 50 and microcontroller 60.

An alternative to having microcontroller 60 perform the G-code decoding is to build the G-code decoding directly into the program stored in read only memory 54. This would eliminate the need for microcontroller 60. Of course, other hardware to perform the G-code decoding can also be used. The choice of which implementation to use is primarily an economic one.

The blocks in FIGS. 1 and 2 are well known in the prior art and are present in the following patents: Fields, U.S. Pat. No. 4,481,412; Scholz, U.S. Pat. No. 4,519,003; and Brugliera, U.S. Pat. No. 4,631,601. For example, block 42 is analogous to element 7 in Scholz and element 17 in Brugliera. Other analogous elements are: command signal receiver 30 and Scholz 14 and Brugliera 12; tuner 46 and Scholz 6 and Brugliera 10; time/channel programming 40 and Scholz 8, 11 and Brugliera 16; record & playback 44 and Scholz 1, 2, 4; command controller 36 and Scholz 11, 10 and Brugliera 12; microprocessor 50 and Fields 27; RAM 62 and Fields 34; ROM 54 and Fields 33; manual controls 34 and Scholz 15, 16; and remote controller 12 and Scholz 26 and Brugliera 18.

FIG. 3 illustrates an alternate preferred embodiment of this invention. In FIG. 3 a remote controller with embedded G-code decoder 80 is provided. The remote controller with embedded G-code decoder 80 is very similar to remote controller 12, except for the addition of the G-code decoder 82. Note that it is also possible in any remote controller to provide a display 84. The remote controller with embedded G-code decoder 80 would be used in conjunction with a normal video cassette recorder/player 70, which would not be required to have an embedded G-code decoder. The numerals for the subelements of video cassette recorder/player 70 are the same as described above for the video cassette recorder/player with G-code decoder 14 and have the same function, except for the absence of G-code decoder 38. This preferred embodiment has the advantage that it can be used in conjunction with VCRs that are presently being used. These do not have a G-code decoding capability. Replacing their remote controllers with ones that have this capability built-in can vastly improve the capability to do timer preprogramming for a modest cost.

FIG. 4 illustrates a possible realization of the G-code decoder 82 built into the remote controller with embedded G-code decoder 80. A microprocessor 60 can be used as before to decode the G-code, as well as interface with the display 84, a clock 85, the keypad 88 and the light emitting diode 28. Alternatively, other hardware implementations can be used to perform the G-code decoding. The clock 85 is provided in the remote controller 80 so that the G-code decoder 82 can be made to have the clock 85 as one of its inputs. This allows the G-code decoding to be a function of the clock 85, which lends a measure of security to the decoding technique and makes it harder to copy.

The remote controller with embedded G-code decoder as described above would send channel, date, time and length information to the video cassette recorder/player 70, which would use the CDTI, information for tuning into the correct channel and starting and stopping the recording function. The remote controller may have to be unique for each different video cassette recorder/player, because each brand or model may have different infrared pulses for each type of information sent such as the channel number keys and start record and stop record keys. The particular infrared pulses used for each key type can be called the vocabulary of the particular remote controller. Each model may also have a different protocol or order of keys that need to be pushed to accomplish a function such as timer preprogramming. The

protocol or order of keys to accomplish a function can be called sentence structure. If there is a unique remote controller built for each model type, then the proper vocabulary and sentence structure can be built directly into the remote controller.

An alternate to having the remote controller with embedded G-code decoder send channel, date, time and length information to the video cassette recorder/player 70, is to have the remote controller with embedded G-code decoder 16 performing more operations to simplify the interfacing problem with existing video cassette recorder/players. In particular, if the remote controller not only performs the G-code decoding to CDTI, but also keeps track of time via clock 85, then it is possible for the remote controller to send just channel, start record and stop commands to the video cassette recorder/player. The channel, start and stop are usually basic one or two key commands, which means there is no complicated protocol or sentence structure involved. Thus, to communicate with a diverse set of video cassette recorder/player models it is only necessary to have memory within the remote controller, such as ROM 64 of FIG. 4, for storing the protocol for all the models or at least a large subset. The G-code would be entered on the remote controller as before and decoded into channel, date, time and length information, which would be stored in the remote controller. Via clock 85, the time would be checked and when the correct time arrives the remote controller would automatically send our commands to the VCR unit for tuning to the correct channel and for starting and stopping the recording. It is estimated that only two (2) bytes per key for about 15 keys need to be stored for the vocabulary for each video cassette recorder/player model. Thus, to cover 50 models would only require about 300\*50=1500 bytes of memory in the remote controller. It would be necessary to position the remote controller properly with respect to the VCR unit so that the infrared signals sent by the remote controller are received by the unit.

Another preferred embodiment is to provide a universal remote controller 90 with an embedded G-code decoder. Universal remote controllers provide the capability to mimic a number of different remote controllers. This reduces the number of remote controllers that a user needs to have. This is accomplished by having a learn function key 94 function on the universal remote controller, as shown in FIG. 5. If the learn function key 94 is pushed in conjunction with another key, the unit will enter into the learn mode. Incoming infrared (IR) pulses from the remote controller to be learned are detected by the infra-red photodiode 96, filtered and wave-shaped into recognizable bit patterns before being recorded by a microcontroller into a battery-backed static RAM as the particular IR pulse pattern for that particular key. This is done for all the individual keys.

An example of more complex learning is the following. If the learn function key 94 in conjunction with the program key 26 are pushed when the G-code switch is "ON", the unit will recognize that it is about to record the keying sequence of a predetermined specific example of timer preprogramming of the particular VCR involved. The user will then enter the keying sequence from which the universal remote controller 90 can then deduce and record the protocol of the timer preprogramming sequence. This is necessary because different VCRs may have different timer preprogramming command formats.

If keys are pushed without the learn function key 94 involved, the microcontroller should recognize it is now in the execute mode. If the key is one of the direct command keys, the microcontroller will read back from its static RAM the stored pulse sequence and send out command words

through the output parallel I/O to pulse the output light emitting diode 28. If the key is the PROG key and the G-code switch is "OFF", then the microcontroller should recognize the following keys up to the next PROG key as a timer preprogramming CDIL command and send it out through the light emitting diode 28. If the G-code switch 22 is set to "ON" and the program key 26 is pushed, the microcontroller should recognize the following keys up to the next PROG key as a G-code command for timer preprogramming. It will decode the G-code into channel, date, start time and length (CDIL) and the microcontroller will then look up in it's static RAM "dictionary" the associated infra-red pulse patterns and concatenate them together before sending them off through the output parallel I/O to pulse the light emitting diode 28 to send the whole message in one continuous stream to the VCR.

FIG. 4 illustrates a possible realization of the G-code decoder 92 that could be built into the universal remote controller with embedded G-code decoder 90. A microcontroller 60 can be used as before to decode the G-code, as well as for interfacing with the input/output functions including the photodiode 96. Alternately, the G-code decoding can be performed with other hardware implementations.

The universal remote controller can also be used in another manner to simplify the interfacing problem with existing video cassette recorder/players. In particular, if the universal remote controller performs not only the G-code decoding to CDIL, but also keeps track of time via clock 85 in FIG. 4, then it is possible for the universal remote controller to send just channel, start record and stop commands to the video cassette recorder/player, which as explained before, are usually basic one key commands, which means there is no complicated protocol or sentence structure involved. Thus, to communicate with a diverse set of video cassette recorder/player models it is only necessary for the universal remote controller to "learn" each key of the remote controller it is replacing. The G-code would be entered on the universal remote controller as before and decoded into channel, date, time and length information, which would be stored in the universal remote controller. Via clock 85, the time would be checked and when the correct time arrives the universal remote controller would automatically send out commands to the VCR unit for tuning to the correct channel and for starting and stopping the recording. It would be necessary to position the universal remote controller properly with respect to the VCR unit so that the signals sent by the universal remote are received by the VCR unit.

There are a number of ways that the G-code decoding can be performed. The most obvious way is to just have a large look up table. The G-code would be the index. Unfortunately, this would be very inefficient and result in a very expensive decoder due to the memory involved. The total storage involved is a function of the number of total combinations. If we allow for 128 channels, 31 days in a month, 48 on the hour and on the half hour start times in a twenty four hour day, and 16 length selections in half hour increments, then the total number of combinations is  $128 \times 31 \times 48 \times 16 = 3,047,424$ . This number of combinations can be represented by a 7 digit number. The address to the table would be the 7 digit number. In the worse case, this requires a lookup table that has about 1,000,000 rows by 15 to 16 digital columns, depending on the particular protocol. These digital columns would correspond to the CDIL information required for "on screen programming". Each digit could be represented by a 4 bit binary number. Thus, the total storage number of bits required for the lookup table would be about

4,000,000  $\times 16 \times 1 = 256,000,000$ . The present state of the art has about 1 million bits per chip. Thus, G-code decoding using a straightforward table lookup would require a prohibitively expensive number of chips.

Fortunately, there are much more clever ways of performing the G-code decoding. FIG. 6 is a flow diagram of a preferred G-code decoding technique. To understand G-code decoding, it is easiest to first explain the G-code encoding technique, for which FIG. 7 is the flow chart. Then the G-code decoding technique, which is the reverse of the G-code encoding will be explained.

The encoding of the G-codes can be done on any computer and is done prior to preparation of any program guide that would include G-codes. For each program that will be printed in the guide, a channel, date, time and length (CDIL) code 144 is entered in step 142. Step 146 separately reads the priority for the channel, date, time and length in the priority vector storage 122, which can be stored in read only memory 64. The priority vector storage 122 contains four tables: a priority vector C table 124, a priority vector D table 126, a priority vector T table 128 and a priority vector I table 130.

The channel priority table is ordered so that the most frequently used channels have a low priority number. An example of the data that is in priority vector C table 124 follows:

channel	4	9	3	8	5	6	11	14	...
priority	6	1	2	3	4	5	5	7	...

Generally the dates of a month all have an equal priority, so the low number days in a month and the low number priorities would correspond in the priority vector D table as in the following example:

date	1	2	3	4	5	5	7	8	9	10	...
priority	0	1	2	3	4	5	6	7	8	9	...

The priority of the start times would be arranged so that prime time would have a low priority number and programs in the dead of the night would have a high priority number. For example, the priority vector T table would contain:

time	6:30 pm	7:00 pm	8:00 pm	7:30 pm	...
priority	0	1	2	3	...

An example of the data that is in the priority vector I table 130 is the following:

length of program (hours)	0.5	1.0	2.0	1.5	5.0	...
priority	0	1	2	3	4	...

Suppose the channel date time length (CDIL) 144 data is 5 19.00 1.5, which means channel 5, 19th day of the month, 7:00 PM, and 1.5 hours in length, then for the above example the  $C_p D_p T_{p,y}$  data 148, which are the result of looking up the priorities for channel, date, time and length in priority tables 124, 126, 128 and 130 of FIG. 7, would be 4 9 1 3. Step 150 converts  $C_p D_p T_{p,y} L_{p,y}$  data to binary numbers. The number of binary bits in each conversion is

determined by the number of combinations involved. Seven bits for  $C_{12}$ , which can be denoted as  $C_8 C_7 C_6 C_5 C_4 C_3 C_2$ , would provide for 128 channels. Five bits for  $D_{12}$ , which can be denoted as  $D_4 D_3 D_2 D_1$ , would provide for 31 days in a month. Six bits for  $I_{12}$ , which can be denoted as  $I_6 I_5 I_4 I_3 I_2 I_1$ , would provide for 48 start times on each half hour of a twenty four hour day. Four bits for length, which can be denoted as  $L_3 L_2 L_1 L_0$ , would provide for a program length of up to 8 hours in half hour steps. Together there are  $7 \times 5 \times 6 \times 22 = 220$  bits of information, which correspond to  $2^7 \times 2^5 \times 2^6 \times 2^4 = 194,504$  combinations.

The next step is to use bit hierarchy key 120, which can be stored in read only memory 64 to reorder the 22 bits. The bit hierarchy key 120 can be any ordering of the 22 bits. For example, the bit hierarchy key might be:

$L_6 C_7 \dots I_1 C_5 T_1 C_1 L_3 D_4 m \dots m$   
 $22 \ 21 \dots 10 \ 9 \ 8 \ 7 \ 6 \ 5 \ 4 \ 3 \ 2 \ 1$

Ideally the bit hierarchy key is ordered so that programs most likely to be the subject of timer preprogramming would have a low value binary number, which would eliminate keystrokes for timer preprogramming the most popular programs. Since all the data information has equal priority, then the  $D_2 D_3 D_4 D_1$  bits are first. Next  $T_1 C_1 L_1$  are used, because for whatever date it is necessary to have a time channel and length and  $T_1 C_1 L_1$  are the most probable in each case due to the ordering of the priority vectors in priority vector storage 122. The next bit in the hierarchy key is determined by the differential probabilities of the various combinations. One must know the probabilities of all the channels, times and lengths for this calculation to be performed.

For example, the probability for channels might be:

channel	4	7	2	3	5	6	11	15	...
priority	0	1	2	3	4	5	6	7	...
probability (%)	5	13	1	3	29	21	2	28	...

The probabilities for times might be:

time	6:30 pm	7:00 pm	8:00 pm	7:30 pm	...
priority	0	1	2	3	...
probability (%)	8	7.8	6	5	...

And, the probabilities for lengths might be:

length of program (hours)	0.5	1.0	2.0	1.5	3.0	...
priority	0	1	2	3	4	...
probability (%)	50	20	15	5	4	...

The probabilities associated with each channel, time and length, as illustrated above, are used to determine the proper ordering. Since the priority vector tables are already ordered by the most popular channel, time, and length, the order in which to select between the various binary bits for one table, for example selecting between the  $C_7 C_6 C_5 C_4 C_3 C_2$  bits, is already known. The  $C_1$  bit would be selected first because as the lowest order binary bit it would select between the first two entries in the channel priority table. Then the  $C_2$  bit would be selected and so on. Similarly, the  $I_1$  and  $I_2$  bits would be used before any of the other time and length bits. A combination of the  $C_1$ ,  $I_1$ ,  $L_1$  and  $D_4 D_3 D_2 D_1$  bits should be used first, so that all the information

is available for a channel, date, time and length. The  $D_3 D_4 D_2 D_1$  bits are all used because the date bits all have equal priority and all are needed to specify a date even if some of the bits are binary zero.

At this point the bit hierarchy key could be:

$T_1 C_1 L_1 D_3 D_1 D_3 D_2 D_1$

The first channel binary bit  $C_1$  by itself can only select between  $2^{1-2}$  channels, and the first two channels have a probability percent of 5 and 4.3, respectively. So the differential probability of  $C_1$  is 9.3.

Similarly, the differential probability of  $T_1$  is  $84.78-15.8$ , and the differential probability of  $I_1$  is  $50.4-20$ . If the rules for ordering the bit hierarchy key are strictly followed, then the first 8 bits of the bit hierarchy key should be ordered as:

$C_1 T_1 I_1 D_3 D_4 D_3 D_2 D_1$

because  $T_1$  has the highest differential priority so it should be next most significant bit after  $D_3$ , followed by  $T_1$  as the next most significant bit, and then  $C_1$  as the next most significant bit. Notice that the bit hierarchy key starts with the least significant bit  $D_1$ , and then is filled in with the highest differential probability bits. This is for the purpose of constructing the most compact codes for popular programs.

The question at this point in the encoding process is what should the next most significant bit in the hierarchy key be:  $I_2$ ,  $C_2$ , or  $L_1$ . This is again determined by the differential probabilities, which can be calculated from the above tables for each bit. Since we are dealing with binary bits, the  $C_2$  in combination with  $C_1$  selects between  $22 \times 4$  channels or 2 more channels over  $C_1$  alone. The differential probability for  $C_2$  is then the additional probabilities of these two additional channels and for the example this is:  $4.3-7$ . In a similar manner  $C_2$  in combination with  $C_1$  and  $C_2$  selects between  $2^{1-2}$  channels or  $4 \times 2^{1-2}$  more channels over the combination of  $C_1$  and  $C_2$ . So the differential probability of  $C_2$  is the additional probabilities of these four additional channels and for the example this is:  $2.9+2.1+24.1=8.8$ . In a similar manner, the differential probabilities of  $T_2$  and  $I_2$  can be calculated to be  $64.5-11$  and  $15.5-5=20$ , respectively. Once all the differential probabilities are calculated, the next step is determining which combinations of bits are more probable.

Now for the above example, which combination is more probable:  $L_1$  with  $C_1 L_1$ , or  $C_1$  with  $T_1 L_1$ , or  $L_1$  with  $T_1 C_1$ . This will determine the next bit in the key. So, which is greater:  $11 \times 9.3 \times 70 = 7161$ ;  $7 \times 15.8 \times 70 = 7742$ ; or  $20 \times 15.8 \times 9.3 = 2938.8$ ? In this case the combination with the greatest probability is  $7 \times 15.8 \times 70 = 7742$ , which corresponds to  $C_2$  with  $T_1 I_1$ . So,  $C_2$  is selected as the next bit in the bit hierarchy key.

55 The next bit is selected in the same way. Which combination is more probable:  $C_3$  with  $T_1 I_2$ , or  $T_2$  with  $C_1$  or  $C_2$  and  $I_1$ , or  $I_2$  with  $C_1$  or  $C_2$  and  $T_1$ . For the example shown, which has the greatest probability:  $8.8 \times 15.8 \times 70 = 9732.8$ ;  $11 \times (9.3+7) \times 70 = 12551$ ; or  $20 \times (9.3+7) \times 15.8 = 5150.8$ ? In this case the combination with the greatest probability is  $11 \times (9.3+7) \times 70 = 12551$ , which corresponds to  $T_2$  with  $C_1$  or  $C_2$  and  $I_2$ . So,  $T_2$  is selected as the next bit in the bit hierarchy key. This procedure is repeated for all the differential probabilities until the entire key is found.

60 Alternatively, the bit hierarchy key can be just some arbitrary sequence of the bits. It is also possible to make the priority vectors interdependent, such as making the length priority vector dependent on different groups of channels. Another technique is to make the bit hierarchy key 120 and the priority vector tables 122, a function of clock 42, as shown in FIG. 7. This makes it very difficult for the key and therefore the coding technique to be duplicated or copied.

For example it is possible to scramble the date bits in the bit hierarchy key **120** as a function of the clock. Changing the order of the bits as a function of the clock would not change the effectiveness of the bit hierarchy key in reducing the number of binary bits for the most popular programs, because the date bits all are of equal priority. This could be as simple as switching the  $D_1$  and  $D_2$  bits periodically, such as every day or week. Thus the bit hierarchy key **120** would switch between

...  $C_2 T_2 I_1 D_3 D_4 D_3 D_2 D_3$  and  
...  $C_2 T_2 I_1 D_1 D_4 D_3 D_2 D_3$

Clearly other permutations of the bit hierarchy key as a function of the clock are possible.

The priority vector tables could also be scrambled as a function of the clock. For example, the first two channels in the priority channel table could just be swapped periodically. If this technique is followed, then the  $C_{p,1}$  of **148** in FIG. 7 would change as a function of the clock **42**. For example,

channel	4	7	2	3	5	9	11	13	...
priority	0	1	2	3	4	5	9	7	...

would change periodically to:

channel	7	4	2	3	5	9	6	11	13	...
priority	0	1	2	3	4	5	6	9	7	...

This would be a fairly subtle security technique, because a decoder that was otherwise correct would only fail if those first two channels were being used. Other clock dependencies are also possible to provide security for the coding technique.

However it is derived, the bit hierarchy key **120** is determined and stored. In step **154** the binary bits of  $C_p D_p T_p L_p$  are rearranged according to the bit hierarchy key **120** to create one 22 bit binary number. Then the resulting 22 bit binary number is converted to decimal in the convert binary number to decimal G-code step **156**. The result is G-code **158**.

If the priority vector and the bit hierarchy key are well matched to the viewing habits of the general population, then it is expected that the more popular programs would require no more than 3 or 4 digits for the G-code.

Now that the encoding technique has been explained the decoding technique is just reversing the coding technique. This is done according to the flow chart of FIG. 6. This is the preferred G-code decoding that can be built into G-code decoder **38** in VCR **14** or the remote controller G-code decoders **82** and **92** in FIGS. 3 and 5.

The first step **102** is to enter G-code **104**. Next the G-code **104** is converted to a 22 bit binary number in step **106**. Then the bits are reordered in step **108** according to the bit hierarchy key **120** to obtain the reordered bits **110**. Then the bits are grouped together and converted to decimal form in step **112**. At this point we obtain  $C_p D_p T_p L_p$  data **114**, which are the indices to the priority vector tables. For the above example, we would have at this step the vector **4 9 1 3**. This  $C_p D_p T_p L_p$  data **114** is then used in step **116** to lookup channel, date, time, and length in priority vector storage **122**. The CDTL **118** for the example above is **5 10 19:00 1:5**, which means channel **5**, 10th day of the month, 7:00 PM, and 1.5 hours in length.

If the coding technique is a function of the clock then it is also necessary to make the decoding technique a function

of the clock. It is possible to make the bit hierarchy key **120** and the priority vector tables **122**, a function of clock **42**, as shown in FIG. 6. This again makes it very difficult for the key and therefore the coding technique to be duplicated or copied. It is also possible to have the decoding and encoding techniques dependent on any other predetermined or preprogrammable algorithm.

Although the above G-code encoding and decoding technique is a preferred embodiment, it should be understood that there are many ways to perform the intent of the invention which is to reduce the number of keystrokes required for timer preprogramming. To accomplish this goal there are many ways to perform the G-code encoding and decoding. There are also many ways to make the encoding and decoding technique more secure besides just making the encoding and decoding a function of the clock. This security can be the result of any predetermined or preprogrammed algorithm.

It is possible in the G-code encoding and decoding techniques to use mixed radix number systems instead of binary numbers. For example, suppose that there are only 35 channels, which would require 6 binary bits to be represented; however, 6 binary bits can represent 64 channels, because  $2^6=64$ . The result is that in a binary number system there are 29 unnecessary positions. This can have the effect of possibly making a particular G-code longer than it really needs to be. A mixed radix number system can avoid this result. For example, for the case of 35 channels, a mixed radix number system with the factors of  $7^1$  and  $5^2$  can represent 35 combinations without any empty space in the code. The allowed numbers for the  $7^1$  factor are 0, 1, 2, 3, and 4. The allowed numbers for the  $5^2$  factor are 0, 1, 2, 3, 4, 5, and 6. For example, digital 0 is represented in the mixed radix number system as **00**. The digital number **34** is represented in the mixed radix number system as **46**, because  $4^2 7^1 + 6^2 5^0 = 34$ . The major advantage of a mixed radix number system is in prioritizing the hierarchy key. If the first 5 channels have about equal priority and the next 30 are also about equal, then the mixed radix number system allows the two tiers to be accurately represented. This is not to say that a mixed radix number system is necessarily preferable. Binary numbers are easier to represent in a computer and use of a fixed radix number system such as binary numbers allows a pyramid of prioritization to be easily represented in the hierarchy key.

Another feature that is desirable in all of the embodiments is the capability to key in the G-code once for a program and then have the resulting CDTL information used daily or weekly. Ordinarily the CDTL information is discarded once it is used. In the case of daily or weekly recording of the same program, the CDTL information is stored and used until it is cancelled. The desire to repeat the program daily or weekly can be performed by having a "WEEKLY" or "DAILY" button on the remote controller or built into the VCR manual controls. Another way is to use one key, such as the PROG key and push it multiple times within a certain period of time such as twice to specify daily or three to specify weekly. For example, if the G-code switch is "ON" and the G-code for the desired program is **99** then daily recording of the program can be selected by the following keystrokes:

"PROG 99 DAILY PROG" or by:

"PROG 99 PROG PROG".

The G-code **99** would be converted to CDTL information, which would be stored and used daily in this case. The recording would begin on the date specified and continue daily after that using the same channel time and length

information. A slight twist is that daily recording could be automatically suspended during the weekends, because most daily programs are different on Saturday and Sunday.

Once a daily or weekly program is set up, then it can be used indefinitely. If it is desired to cancel a program and if there is a "CANCEL" button on the remote controller or manual control for the VCR, then one way to cancel a program (whether it is a normal CDTL, daily or weekly entry) is to key in the following:

"PROG xx CANCEL", where xx is the G-code.

Again as before there are alternate ways of accomplishing this.

If "on screen programming" is available, then the programs that have been selected for timer preprogramming could be reviewed on the screen. The daily and weekly programs would have an indication of their type. Also the G-codes could be displayed along with the corresponding CDTL information. This would make it quite easy to review the current "menu" and either add more programs or cancel programs as desired.

A television calendar 200 according to this invention is illustrated in FIG. 8. As shown, the television calendar has multiple day of year sections 202, multiple day sections 204, multiple time of day sections 206, channel identifiers 208, and descriptive program identifiers 210, including the name of the program, arranged in a manner that is common in television guide publications. Arranged in relation to each channel identifier is a compressed code indication 212 or G-code containing the channel, date, time and length information for that entry in the television calendar. FIG. 8 shows how easy it is to perform timer programming. All one needs to do is find the program one wants to watch and enter the compressed code shown in the compressed code indication. This is in contrast to having to deal with all the channel, date, time and length entries separately. At least the channel, date and time are explicitly stated in the television guide. The length is usually only available by searching the guide to find the time of day section 204 where a new program begins and then performing some arithmetic to find the length of the program. Using the compressed G-code avoids all these complications.

For cable television programs, there is an additional issue that needs to be addressed for the compressed G-code to be useful. In a normal television guide, CDTI information is available for all the normal broadcast channels in the form of numbers including the channel numbers, such as channel 4 or 7. However, for cable channels like HBO, LSPN etc., only the names of the channels are provided in most television listings. The reason for this is that in some metropolitan areas, such as Los Angeles, there may be only one (1) edition of television guide, but there may be quite a few cable carriers, each of which may assign HBO or ESPN to different cable channel numbers. In order for a compressed code such as the G-code to be applicable to the cable channels as published by a wide area television guide publication, the following approach can be used.

First, all the cable channels would be permanently assigned a unique number, which would be valid across the nation. For example, we could assign ESPN to cable channel 1, HBO as cable channel 2, S10 as cable channel 3, etc. This assignment would be published by the television guide publications.

The video cassette recorder apparatus, such as the remote controller, the VCR unit or both, could then be provided with two (2) extra modes "set" and "cable channel". One way of providing the user interface to these modes would be to provide two (2) extra buttons: one called SET and one called

CABLE CHANNEL. The buttons could be located on the video cassette recorder unit itself or located on a remote controller, as shown in FIGS. 1, 3 and 5, where SEL is element 168 and CABLE CHANNEL is element 170. Of course, other user interfaces are possible.

Next, the television viewer would have to go through a one-time "setting" procedure of his VCR for all the cable channels that he would likely watch. This "setting" procedure would relate each of the assigned numbers for each cable channel to the channel number of the local cable carrier. For example, suppose that the local cable carrier uses channel 6 for ESPN, then cable channel number 1 could be assigned to ESPN, as shown in the following table.

Cable Channel Name	Assigned Cable Chnl No	Channel Number in the local cable carrier
ESPN	1	6
HBO	2	24
S10	3	23
.	.	.
.	.	.
.	.	.
DOS	8	75

The user could perform the "setting" procedure by pushing the buttons on his remote controller as follows:

SET 06 CABLE CHANNEL 1 PROGRAM  
SET 124 CABLE CHANNEL 2 PROGRAM  
SET 123 CABLE CHANNEL 3 PROGRAM  
SET 125 CABLE CHANNEL 4 PROGRAM

The "setting" procedure would create a cable channel address table 162, which would be loaded into RAM 52 of command controller 36. For the above example, the cable channel address table 162 would have the following information.

TABLE 162

CABLE CHANNEL ADDRESS
1
2
3
.
.
.
8

After the "setting" procedure is performed, the TV viewer can now select cable channels for viewing by the old way: e.g. pushing the key pad buttons 24 will select HBO. He can also do it the new way: e.g. by pushing CABLE CHANNEL 2, which will also select HBO. The advantage of the new way is that the television guide will publish [C2] next to the program description, so the viewer will just look up the assigned channel number identifier instead of having to remember that HBO is local cable channel 24. When the CABLE CHANNEL button is pushed, command controller 36 knows that it will look up the local cable channel number in cable channel address table 162 to tune the VCR to the correct channel.

For timer preprogramming and for using the compressed G-code, a way to differentiate between broadcast and cable channels is to add an eighth channel bit, which would be set to 0 for normal broadcast channels and 1 for cable channels such as HBO. This eighth channel bit could be one of the low order bits such as the third bit C<sub>3</sub> out of the eight channel

bits, so that the number of bits to specify popular channels is minimized, whether they be normal broadcast or cable channels. For a normal broadcast channel, the 7 other bits can be decoded according to priority vector C table 124. For a cable channel, the 7 other bits can be decoded according to a separate cable channel priority vector table 160, which could be stored in ROM 54 of microcontroller 36. The cable channel priority vector table can be set ahead of time for the entire country or at least for an area covered by a particular wide area television guide publication.

A television guide that carries the compressed code known as the G-code will now print the cable channel information as follows:

6:30 pm

[C2] HBO xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx (4679  
xxxxxx(program description)xxxxxxxxxxxxxx  
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

The [C2] in front of HBO reminds the viewer that he needs only to push CABLE CHANNEL 2 to select HBO. The (4679) is the G-code indication for this particular program.

FIG. 8 shows a section of a television guide. The cable channels all have an assigned cable channel number 188 after the cable channel mnemonic. Other than that the cable channel information is arranged the same as the broadcast channels with a compressed G-code 212 associated with the channel.

For timer preprogramming, the viewer need only enter the number 4679 according to the unit's G-code entry procedure, e.g. PROG 4679 PROG. The G-code decoder unit will decode this G-code into "cable channel 2" and will also signal the command controller 36 with a cable channel signal 164, as shown in FIGS. 1 and 2, because the extra channel bit will be "1" which distinguishes that the G-code is for a cable channel; then, since the association of "cable channel 2" with channel 24 has been established earlier in the "setting" procedure, the command controller, if it has received a cable channel signal, will immediately look up 2 in the cable channel address table 162 to translate it to cable channel 24, which will be used as the recording channel at the appropriate time. By associating the G-code with the assigned cable channel number rather than the local cable channel number, the G-code for that program will be valid in the whole local area, which may have many different cable carriers each of which may have different local cable channel numbers.

To include the cable channel compressed G-code feature, the decoding and encoding algorithms are as shown in FIGS. 9 and 10, respectively. The coding should be explained first before the decoding. The primary change in FIG. 10 from FIG. 7 is that a cable channel priority vector table 160 has been added and is used in look up priority step 180 if a cable channel is being encoded. Also if a cable channel is being encoded then the cable channel bit is added in the correct bit position in the convert  $C_p D_p I_p J_p$  to binary numbers step 182. This could be bit  $C_p$ , as discussed before. The bit hierarchy key could be determined as before to compress the number of bits in the most popular programs; however, it needs to be 23 bits long to accommodate the cable channel bit. The maximum compressed G-code length could still be 7 digits, because 223-8,388,608.

The decoding is shown in FIG. 9 and is just the reverse of the encoding process. After step 108, test cable channel bit 174 is added and effectively tests the cable channel bit to determine if it is a "1". If so then the command controller 36 is signalled via cable channel signal 164 of FIGS. 1 and 2 that the CD FL 118 that will be sent to it from G-code decoder 38 is for a cable channel. Then the command controller knows

to look up the local cable carrier channel number based on the assigned cable channel number. In step 176 of FIG. 9, the priority vector tables including the cable channel priority vector table 160 are used to look up the CD FL 118 information.

An alternate to having the command controller receive a cable channel signal 164 is for the G-code decoder to perform all of the decoding including the conversion from assigned cable channel number to local cable carrier number. This would be the case for the remote controller implementation of FIG. 2. FIG. 11 shows the implementation of the entire decode algorithm if this step is included. All that needs to be added is convert assigned channel to local cable carrier channel step 166, which performs a lookup in cable channel address table 162, if the cable channel bit indicates that a cable channel is involved. Step 166 effectively replaces step 174 in FIG. 9.

Another issue that needs addressing is the number of programs that can be preprogrammed. Since the G-code greatly simplifies the process of entering programs, it is likely that the user will quickly learn and want to enter a large number of programs; however, some existing VCRs can only store up to four (4) programs, while some can store as many as eight. Thus, the user may get easily frustrated by the programming limitations of the VCR.

One approach to this problem, is to perform the compressed G-code decoding in the remote controller and provide enough memory there to store a large number of programs, e.g. 20 or 40. The remote controller would have the capability of transferring periodically several of these stored programs at a time to the VCR main unit. To provide this capability, extra memory called stack memory 76 is required inside the remote unit, as shown in FIG. 12, which other than that is identical to FIG. 4. Stack memory 76 can be implemented with a random access memory, which may in fact reside in the microcontroller itself, such as RAM 62.

The stack memory 76 is where new entry, insertion & deletion of timer preprogramming information is carried out. It is also where editing takes place. The top memory locations of the stack, for example the first 4 locations, correspond exactly to the available timer preprogramming memory in the VCR main unit. Whenever the top of the stack memory is changed, the new information will be sent over to the VCR main unit to update it.

FIG. 13 shows the sequence of events when the user enters a G-code program on the keypad of the remote controller. For illustration purposes, suppose that the VCR main unit can only handle four (4) programs. Suppose also that the stack memory capacity is 20 timer programs. Referring to the flow chart in FIG. 13, when the user enters a G-code in step 230, the microcontroller 60 first decodes it into the CD FL information in step 234 and displays it on the display unit with the additional word "entered" also displayed. The microcontroller then enters the decoded program into the stack memory in step 236.

If this is the first program entered, it is placed at the top location of the stack memory. If there are already programs in the stack memory, the newly entered program will first be provisionally placed at the bottom of the stack memory. The stack memory will then be sorted into the correct temporal order in step 240, so that the earliest program in time will appear in the top location and the last program in time will be at the bottom. Notice that the nature of the temporally sorted stack memory is such that if stack memory location n is altered, then all the locations below it will be altered.

For example, suppose the stack memory has six (6) entries already temporally ordered, and a new entry is entered

whose temporal ordering places it in location 3 (1 being the top location). If this entry is placed into location 3, information which was in location 3, 4, 5, 6 will be shifted to locations 4, 5, 6, and 7. Locations 1 and 2 will remain unchanged.

The microcontroller 60, after doing the temporal ordering, checks in step 242 whether the first  $n$  entries have changed from before, where for the current example  $n$  equals 4. In this case, since a new program has been entered into location 3, what used to be in location 3 now moves to location 4. Since the VCR's main unit program menu of 4 entries should correspond exactly to location 1 through 4 of the stack memory, entries 3 and 4 on the VCR main unit must now be revised. The microcontroller therefore sends out the new entries 3 & 4 to the main unit, in step 244 of FIG. 13. If the newly entered program, after temporal ordering, gets entered into location 5, then entries 1 through 4 have not changed from before and the microcontroller will not send any message to the VCR main unit and the microcontroller will just resume monitoring the clock 85 and the keyboard 88 as per step 246. It is assumed that when the user enters the G-code in step 230, the remote controller is pointed at the VCR main unit. The other steps of FIG. 13 happen so fast that the changes are sent in step 244 while the remote controller is still being pointed at the VCR main unit.

If the user decides to delete a program in step 232, the deletion is first carried out in the stack memory. If the first 4 entries are affected, the microcontroller will send the revised information over to the VCR main unit. If the first 4 entries are not affected, then again the remote controller unit will not send anything. The deletion will only change the lower part of the stack (lower meaning location 5 to 20). This new information will be sent over to the VCR main unit at the appropriate time.

In the meantime, the VCR main unit will be carrying out its timer programming function, completing its timing pre-programming entries one by one. By the time all 4 recording entries have been completed, the stack in the remote must send some new entries over to "replenish" the VCR main unit (if the stack has more than 4 entries).

The real time clock 85 in the remote controller unit is monitored by the microcontroller to determine when the programs in the main unit have been used up. Referring to the flow chart in FIG. 14, the microcontroller periodically checks the clock and the times for the programs at the top of the stack in step 250 (say the first 4 entries), which are identical to the VCR's main unit's menu. If one or of the periodic checks, it is determined that the recording of the main unit's menu is complete, then if there are more entries in the stack, which is tested in step 252, the display unit will be set to a blinking mode or display a blinking message in step 258 to alert the user to send more programs. Next time the user picks up the remote unit, the blinking will remind him that the VCR main unit's program menu has been completed and it is time to replenish the VCR main unit with program entries stored in the remote. The user simply picks up the remote and points it towards the VCR main unit and presses "ENTER". This will "pop" the top of the stack memory in step 260, i.e. pop all the entries in the stack up by four locations. The microcontroller will then send the new "top of the stack" (i.e. top 4 entries) over to the VCR main unit in step 262. This process will repeat until the whole stack has been emptied.

Another preferred embodiment of an apparatus for using compressed codes for recorder preprogramming is the instant programmer 300 of FIG. 15. The instant programmer 300 has number keys 302, which are numbered 0 through 9,

a CANCILL key 304, a REVIEW key 306, a WELKLY key 308, a ONCE key 310 and a DAILY (M-F) key 312, which are used to program the instant programmer 300. A lid normally covers other keys, which are used to setup the instant programmer 300. When lid 314 is lifted, the following keys are revealed: SAVF key 316, ENTR key 318, CLOCK key 320, C11 key 322, ADD TIME key 324, VCR key 326, CABLE key 328, and TEST key 330. Other features of instant programmer 300 shown on FIG. 15 are: liquid crystal display 350 and red warning light emitting diode 332. The front elevation view, FIG. 16 of instant programmer 300 shows front infrared (IR) diode 340 mounted on the front side 338. By placing instant programmer 300 in front of the equipment to be programmed such as video cassette recorder 370, cable box 372, and television 374, as shown in FIG. 19, the front infrared (IR) diode 340 can transmit signals to control program recording. An IR transparent cover 336 covers additional IR transmission diodes, which are explained below.

FIG. 18 shows a detail of the liquid crystal display 350. Certain text 354 is at various times visible on the display and there is an entry area 356. Time bars 352 are displayed at the bottom of the display and their function is described below.

A companion element to the instant programmer 300 is the mounting stand 360, shown in FIG. 17, which is designed to hold instant programmer 300 between left raised side 362 and right raised side 364. The instant programmer 300 is slid between left raised side 362 and right raised side 364 until coming to a stop at front alignment flange 365, which is at the front of mounting stand 360 and connected across left raised side 362 and right raised side 364. Together elements 362, 364 and the front alignment flange provide alignment for instant programmer 300 so that the transparent cover 336 and the IR diodes 342, 344, 346 and 348, shown in FIG. 17 are properly aligned for transmission, when the instant programmer is used as shown in FIG. 20. The mounting stand 360 has an alignment flange 366, which has the purpose of aligning the back edge of mounting stand 360, which is defined as the edge along which alignment flange 366 is located, along the front side of a cable box or VCR, or similar unit as shown in FIG. 20. When aligned as shown in FIG. 20, the mounting stand 360 aligns the instant programmer 300 so that the left IR diode 342, down IR diode 344, two back IR diodes 346 and right IR diode 348, as shown in FIG. 17, are in position to transmit signals to video cassette recorder 370 and cable box 372, as necessary. If the VCR, or similar cable box functions are located within the television 374 itself, then the instant programmer 300 could be positioned to transmit to the television 374, either in the manner of FIG. 19 or by placing the mounting stand on top of the television in the manner of FIG. 20.

By using mounting stand 360, the user only need to align the mounting stand 360, and the instant programmer 300 once with the equipment to be programmed, rather than having the user remember to keep the instant programmer 300 in the correct location to transmit via front infrared (IR) diode 340, as shown in FIG. 19. Current experience with various remote controllers shows that it is difficult at best to keep a remote controller in a fixed location, for example, on a coffee table. The mounting stand 360 solves this problem by locating the instant programmer 300 with the equipment to be controlled. The left IR diode 342, down IR diode 344, two back IR diodes 346 and right IR diode 348 are positioned to transmit to the left, downward, backward, and to the right. The downward transmitter assumes that mounting stand 360 will be placed on top of the unit to be programmed. The left and right transmission allows units to the

left or right to be programmed. The backward transmission back IR diodes 346 are provided so that signals can bounce off walls and other objects in the room. The front IR diode 340, the left IR diode 342, the right IR diode 348 and the down IR diode 344 are implemented with 25 degree emitting angle diodes. Two back IR diodes are provided for greater energy in that direction and are implemented with 5 degree emitting angle diodes, which focus the energy and provide for greater reflection of the IR energy off of walls or objects in the room.

Most VCR's and cable boxes can be controlled by an infrared remote controller; however, different VCR's and cable boxes have different IR codes. Although there are literally hundreds of different models of VCR's and cable boxes, there are fortunately only tens of sets of IR codes. Each set may have a few tens of "words" that represent the different keys required, e.g., "power", "record", "channel up", "channel down", "stop", "0", "1", "2" etc. For the purpose of controlling the VCR and cable box to do recording, only the following "words" are required: "0", "1", "2", "3", "4", "5", "6", "7", "8", "power", "record", "stop". The IR codes for these words for all the sets are stored in the memory of the instant programmer 300, which is located in microprocessor 380 of FIGS. 21 and 22. During setup of the instant programmer 300, the user interactively inputs to the instant programmer 300 the type and model of his VCR and cable box. The correct set of IR codes will be recalled from memory during the actual control process. In the case where the user only has a VCR, the infrared (IR) codes for that particular VCR will be recalled to control the VCR. In the case where the user has a VCR and a cable box, the IR codes "power", "record", "stop" will be recalled from the set that corresponds to the VCR whereas the IR codes for "0" through "9" will be recalled from the set that corresponds to the cable box. The reason is that in this case, the cable box controls the channel switching. Hence the channel switching signals "0" through "9" must be sent to the cable box instead of the VCR.

Initially, the user performs a setup sequence. First, the user looks up the number corresponding to the model/brand of VCR to be programmed in a table, which lists the VCR brand name and a two digit code. Then with the VCR tuned to Channel 3 or Channel 1, whichever is normally used, the user turns the VCR "ON". Then the user presses the VCR key 326. When the display shows VCR, the user presses the two digit code looked up in the VCR model/brand table (for example 01 for RCA). The user points the instant programmer 300 at the VCR and then presses ENTER key 318. The red warning light emitting diode 332 will flash while it is sending a test signal to the VCR. If the VCR turned "ON" and changed to Channel 09, the user presses the SAVE key 316 and proceeds to the set clock step. If the VCR did not turn "ON" or turned "ON" but did not change to Channel 09 the user presses ENTER key 318 again and waits until red warning light emitting diode 332 stops flashing. The instant programmer 300 sends the next possible VCR code, while the red warning light emitting diode 332 is flashing. If the VCR turns "ON" and changed to Channel 09 the user presses SAVE key 316, otherwise the user presses ENTER key 318 again until the VCR code is found that works for the VCR. The display shows "END" if all possible VCR codes for that brand are tried. If so, the user presses VCR key 326 code 00 and then ENTER key 318 to try all possible codes, for all brands, one at a time.

Once the proper VCR code has been found and saved, the next setup step is to set the clock on instant programmer 300. First, the user presses the CLOCK key 320. When the

display shows: "YR:", the user presses the year (for example 90), then presses ENTER key 318. Then the display shows "MO:", and the user presses the month (for example 07 is July), and then presses ENTER key 318. This is repeated for "DA:" date (for example 01 for the 1st), "Hr:" hour (for example 02 for 2 o'clock), "Mn:" minute (for example 05 for 5 minutes), and "AM/PM:" 1 for AM or 2 for PM. After this sequence, the display will show "SAVE" for a few seconds and then the display will show the current time and date that have been entered. It is no longer necessary for the user to set the clock on his/her V.R.

Next, if the instant programmer 300 is also to be used as a cable box controller, then the setup steps are as follows. First, the number corresponding to the model/brand of cable box (converter) to be controlled is looked up in a cable box model brand table, that lists cable box brands and corresponding two digit codes. The VCR is tuned to Channel 03 or 04 and turned "OFF". Then the cable box is tuned to Channel 02 or 03, whichever is normal, and left "ON". Then the CABLE key 328 is pressed. When the display shows: "CA B:", the user enters the two digit code looked up in cable box model brand table, points the instant programmer 300 at the cable box (converter) and presses ENTER key 318. The red warning light emitting diode 332 will flash while it is sending a test signal to the cable box. If the cable box changed to Channel 09; then the user presses SAVE key 316; however, if the cable box did not change to Channel 09 the user presses ENTER key 318 again and waits until red warning light emitting diode 332 stops flashing, while the next possible code is sent. This is repeated until the cable box changes to Channel 09 and when it does the user presses SAVE key 316. If the display shows "END" then the user has tried all possible cable box codes for that brand. If so, the user presses cable code 00 and then ENTER key 318 to try all possible brand's codes, one at a time.

For some people (probably because they have cable or satellite), the channels listed in their television guide or calendar are different from the channels on their television or cable. If they are different, the user proceeds as follows. First, the user presses the CII key 322. The display will look like this: "Guide CII TV CII". Then the user presses the channel printed in the television guide or calendar (for example, press 02 for channel 2), and then the user presses the channel number that the printed channel is received on through his/her local cable company. Then the user presses ENTER key 318. This is repeated for each channel listing that is on a different channel than the printed channel. When this procedure is finished the user presses SAVE key 316.

Typically the television guide or calendar in the area will have a chart indicating the channel number that has been assigned to each Cable and broadcast channel, for example: HBO, CNN, ABC, CBS, NBC, etc. This chart would correspond, for example, to the left two columns of FIG. 28. For example, suppose the television guide or calendar has assigned channel 14 to HBO but the user's cable company delivers HBO on channel 18. Since the channel numbers are different, the user needs to use the CH key 322. The user will press the CH button (the two blank spaces under the display "Guide CII" will flash). The user then presses 14 (now the two blank spaces under the display "TV CII" will flash). The user then presses 18 and then ENTER key 318. This is repeated for each channel that is different. When finished, the user presses SAVE key 316.

After the channel settings have been saved, the user may review the settings by pressing CII key 322 and then REVIEW key 306. By repeated pressing of the REVIEW key 306 each of the set channels will scroll onto the display, one at a time.

Then the user can test to make sure that the location of the instant programmer 300 is a good one. First, the user makes sure that the VCR is turned "ON" but plugged in and makes sure that the cable box (if there is one) is left "ON". Then the user can press the **LIST** key 330. If there is only a VCR, then if the VCR turned "ON", changed to channel 09 and started recording, and then turned "OFF", then the VCR controller is located in a good place.

If there is also a cable box, then if the VCR turned "ON", the cable box turned to channel 09 and the VCR started recording, and then the VCR stopped and turned "OFF", then the instant programmer 300 is located in a good place.

To operate the instant programmer 300, the VCR should be left ON and the cable box ON. The user looks up in the television guide the compressed code for the program, which he/she wishes to record. The compressed code 212 is listed in the television guide, as shown in FIG. 8. The television guide/calender that would be used with this embodiment would have the same elements as shown on FIG. 8 except that element 188 of FIG. 8 is not required. The compressed code 212 for the program selected by the user is entered into the instant programmer 300 by using the number keys 302 and then the user selects how often to record the program. The user presses the **ONCE** key 310 to record the program once at the scheduled time, or the user presses the **WEEKLY** key 308 to record the program every week at the same scheduled time until cancelled or the user presses the **DAILY (M-F)** key 312 to record the program each day Monday through Friday at the same scheduled time until cancelled. This is most useful for programs such as soapbox operas that air daily, but not on the weekend. To confirm the entry, the instant programmer 300 will immediately decode the compressed code and display the date, channel and start time of the program entered by the user. The length of the entered program is also displayed by time bars 352 that run across the bottom of the display. Each bar represents one hour (or less) of program.

Then the user just needs to leave the instant programmer 300 near the VCR and cable box so that commands can be transmitted, and at the right time, the instant programmer 300 will turn "ON" the VCR, change to the correct channel and record the program and then turn the VCR "OFF". The user must just make sure to insert a blank tape.

The **REVIEW** key 306 allows the user to step through the entered programs. These are displayed in chronological order, by date and time. Each time the **REVIEW** key 306 is pressed, the next program is displayed, until "UND" is displayed, when all the entered programs have been displayed. If the **REVIEW** key 306 is pressed again the display will return to the current date and time.

If the user wishes to cancel a program, then the user presses **REVIEW** key 306 until the program to cancel is displayed, then the user presses **CANCEL** key 304. The display will say "CANCELED". Also, any time the user presses a wrong number, pressing the **CANCEL** key 304 will allow the user to start over.

Certain television programs, such as live sports, may run over the scheduled time slot. To ensure that the entire program is recorded, the user may press the **ADD TIME** key 324 to increase the recording length, even while the program is being recorded. The user presses the **REVIEW** key 306 to display the program, then presses **ADD TIME** key 324. Each time **ADD TIME** key 324 is pressed, 15 minutes is added to the recording length.

When the current time and date is displayed, the amount of blank tape needed for the next 24 hours is also displayed by the time bars 352 that run across the bottom of the

display. Each bar represents one hour (or less) of tape. The user should check this before leaving the VCR unattended to ensure that there is enough blank tape.

Each time a program code is entered, the instant programmer 300 automatically checks through all the entries to ensure that there is no overlap in time between the program entries. If the user attempts to enter a program that overlaps in time with a program previously entered, then the message "CLASH" appears. Then, as summarized by step 432 of FIG. 23, the user has the following options: 1) if the user wishes to leave the program previously entered and forget about the new one, the user does nothing and after a short time delay, the display will return to show the current time and date; 2) if the user wishes the program which starts first to be recorded to its end, and then to record the remainder of the second program, then the user presses **ONCE** key 310, **DAILY (M-F)** key 312, or **WEEKLY** key 308 again (whichever one the user pushed to enter the code). If the programs have the same starting time, then the program most recently entered will be recorded first. If on being notified of the "CLASH", the user decides the new program is more important than the previously entered program, then the user can cancel the previously entered program and then re-enter the new one.

In some locations, such as in some parts of Colorado, the cable system airs some channels three (3) hours later/earlier than the times listed in the local television guide. This is due to time differences depending on whether the channel is received on a east or west satellite feed. For the user to record the program 3 hours later than the time listed in the television guide the procedure is as follows. First the user enters the code for the program and then presses **SAVE** key 316 (for +) and then presses **ONCE** key 310, **DAILY (M-F)** key 312, or **WEEKLY** key 308, as desired. For the user to record the program 3 hours earlier than the time listed in the television guide the procedure is as follows. First the user enters the code for the program and then presses **ENTER** key 318 (for -) and then presses **ONCE** key 310, **DAILY (M-F)** key 312, or **WEEKLY** key 308, as desired. The instant programmer 300 will display the time that the program will be recorded, not the time shown in the television guide.

There are certain display messages to make the instant programmer 300 more user friendly. The display "LO BATT" indicates that the batteries need replacement. "Err: ENTRY" indicates an invalid entry during set up. "Err: CODE" indicates that the program code number entered is not a valid number. If this is displayed the user should check the television guide and reenter the number. "Err: DATE" indicates the user may have tried to select a daily recording (Monday to Friday) for a Saturday or Sunday program; tried to select weekly or daily recording for a show more than 7 days ahead, because the instant programmer 300 only allows the weekly or daily recording option to be used for the current week's programs ( $\pm 7$  days); or tried to enter a program that has already ended. "FULL" indicates that the stack storage of the programs to be recorded, which is implemented in random access memory (RAM) inside the instant programmer 300 has been filled. The user could then cancel one or more programs before entering new programs. "Err: EMPTY" indicates there are no programs entered to be recorded. The number of programs to be recorded that can be stored in the instant programmer 300 varies depending on the density of RAM available and can vary from 10 to more.

FIG. 21 is a schematic of the circuitry needed to implement the instant programmer 300. The circuitry consists of microcomputer 380, oscillator 382, liquid crystal display 384, key pad 386, five way IR transmitters 390 and red

warning light emitting diode 332. The microcomputer 380 consists of a CPU, ROM, RAM, I/O ports, timers, counters and clock. The ROM is used for program storage and the RAM is used among other purposes for stack storage of the programs to be recorded. The liquid crystal display 384 is display 350 of FIGS. 15 and 18. The key pad 385 implements all the previously discussed keys. The five way IR transmitters 390 consists of front infrared (IR) diode 340, left IR diode 342, down IR diode 344, two back IR diodes 346 and right IR diode 348. FIG. 22 shows the detailed schematic of the instant programmer 300 circuitry and previously identified elements are identified by the same numbers. The microcomputer can be implemented with a NEC uPD7530X part, which can interface directly with the display, the light emitting diodes and the oscillator. The 25 degree IR diodes can be implemented with NEC 313AC parts and the 5 degree IR diodes can be implemented with Lutron 2871 C IR diodes.

The flowcharts for the program that is stored in the read only memory (ROM) of the microcomputer 380 that executes program entry, review and program cancellation, and record execution are illustrated in FIGS. 23, 24, and 25, respectively. The FIG. 23 for program entry, which process was described above, consists of the following steps: display current date, time and time bars step 402, which is the quietest state of instant programmer 300; scan keyboard to determine if numeric decimal compressed code entered step 404; display code as it is entered step 406; user checks if correct code entered step 408 and user presses CANCEL key 304 step 428; user advances or retards start time by three hours by pressing SAVE key 316 or ENTER key 318 step 410; user presses ONCE key 310, WEEKLY key 308 or DAILY key 312 key step 412; microcomputer decodes compressed code into CDTT step 414; test if conflict with stored programs step 416, if so, display "C1ASH" message step 420, user presses ONCE key 310, WEEKLY key 308 or DAILY key 312 step 422, then accommodates conflicting entries step 432, as described above in the discussion of the "CLASH" options, and entry not saved step 424; set display as channel, start time and duration (time bars) for ONCE, or DA, channel, start time and duration for DAILY, or day of week, channel, start time and duration for WEEKLY step 418; user presses ADD TIME key 324, which adds 15 minutes to record time step 426; user checks display step 430; enter program on stack in chronological order step 434 wherein the stack is a portion of the RAM of microcontroller 380; and calculate length of tape required and update time bars step 436.

The FIG. 24 flowchart for review and cancellation, which process was described above, consists of the following steps: display current date, time and time bars step 402; REVIEW key 306 pressed step 442; test if stack empty step 444, display "EMPTY" step 446, and return to current date and time display step 448; display top stack entry step 450; user presses ADD TIME key 324 step 452 and update time bars step 460; user presses REVIEW key 306 step 454 and scroll stack up one entry step 462; user presses CANCEL key 304 step 456 and display "CANCELLED" and cancel program step 464; and user does nothing step 458 and wait 30 seconds step 466, wherein the 30 second timeout can be implemented in the timers of microcomputer 380.

The FIG. 25 flowchart for record execution, which is the process of automatically recording a program and which was described above, consists of the following steps: compare start time of top program in stack memory with current time step 472; test if three minutes before start time of program step 474; start red warning LED 332 blinking for 30 seconds

step 476; display channel, start time and blinking "START" message step 478; is correct start time reached step 480 and send power ON signal to VCR and display "RLC" message step 482; test if a cable box is input to VCR step 484, send channel switching signals to VCR step 486 and send channel switching signals to cable box step 488; send record signals to VCR step 490; compare stop time with current time step 492, test if stop time reached step 494 and display "END" message step 496; send stop signals to VCR step 498; send power OFF signal to VCR step 500; and pop program stack step 502.

FIG. 26 is a flowchart of the method for encoding channel, date, time and length (CDTL) into decimal compressed code 510. This process is done "offline" and can be implemented on a general purpose computer and is done to obtain the compressed codes 212 that are included in the program guide or calendar of FIG. 8. The first step in the encoding method is the enter channel, date, time and length (CDTL) step 512 wherein for a particular program the channel, date, start time and length (CDTL) 514 of the program are entered. The next step is the lookup assigned channel number step 516, which substitutes an assigned channel number 522 for each channel 518. Often, for example for network broadcast channels, such as channel 2, the assigned channel number is the same; however, for a cable channel such as HBO a channel number is assigned and is looked up in a cable assigned channel table 520, which would essentially be the same as the first two columns of the table of FIG. 28. Next, the lookup priority of channel, date and time/length in priority vector tables step 524 performs a lookup in priority vector channel (C) table 526, priority vector date (D) table 528 and priority vector time/length (IL) table 530 using the indices of channel, date and time/length, respectively, to produce the vector  $C_f, D_f, IL_f$  532. The use of a combined time/length (IL) table to set priorities recognizes that there is a direct relationship between these combinations and the popularity of a program. For example, at 6:30 PM, a short program is more likely to be popular than a 2 hour program, because it may be the dinner hour.

The channel priority table is ordered so that the most frequently used channels have a low priority number. An example of the data that is in the priority vector C table 526 follows:

channel	4	7	2	3	5	6	11	13	...
priority	0	1	2	3	4	5	6	7	...

Generally the dates of a month all have an equal priority or equal usage, so the low number days in a month and the low number priorities would correspond in the priority vector D table 528 as in the following example.

date	1	2	3	4	5	6	7	8	9	10	...
priority	0	1	2	3	4	5	6	7	8	9	...

The priority of the start times and length of the programs could be arranged in a matrix that would assign a priority to each combination of start times and program lengths so that more popular combinations of start time and length would have a low priority number and less popular combinations would have a high priority number. For example, a partial priority vector IL table 530 might appear as follows.

Priority TI TABLE

Length (hrs)	TIME			
	6:30 pm	7:00 pm	7:30 pm	8:00 pm
5	8	4	7	10
1.0	12	15	14	18
1.5	20	19	17	30

Suppose the channel, date, time and length (CDT1) 514 data is channel 5, Feb. 10, 1990, 7:00 PM and 1.5 hours in length, then the  $C_p D_p T_p$  data 532 for the above example would be 4 9 19. The next step is the convert  $C_p, D_p, T_p$  to binary numbers and concatenate them into one binary number step 534, resulting in the data word . . .  $T_1 T_2 C_1 \dots C_5 D_1 \dots D_5$ . For the example given above, converting the . . .  $T_1 T_2 T_3 \dots C_2 C_3 \dots D_2 D_3$  536 word to binary would yield the three binary numbers . . . 0010011, . . . 0100, . . . 01001. The number of binary bits to use in each conversion is determined by the number of combinations involved. This could vary depending on the implementation; however one preferred embodiment would use eight bits for  $C_p$  denoted as  $C_6 C_7 C_8 C_9 C_1 C_2 C_3 C_4$ , which would provide for 256 channels, five bits for  $D_p$ , which can be denoted as  $D_4 D_5 D_6 D_7 D_8$ , would provide for 31 days in a month, and fourteen bits for  $T_p$ , denoted as  $T_{14} \dots T_{1} T_{12} T_{11} T_{10}$ , which would provide for start times spaced every 5 minutes over 24 hours and program lengths in increments of 5 minute lengths for programs up to 3 hours in length and program length in increments of 15 minute lengths for programs from 3 to 8 hours in length. This requires about  $28^8 (36 \cdot 20) = 16,128$  combinations, which are provided by the  $2^{14} \cdot 16 \cdot 384$  binary combinations. Altogether there are  $8 \cdot 5 \cdot 14 = 27$  bits of information  $T_{14} \dots T_1 T_{12} T_{11} T_{10} \dots C_2 C_1 D_8 \dots D_2 D_1$ . For the above example padding each number with zeros and then concatenating them would yield the 27 bit binary number: 000000000100110000010001001.

The next step is to use bit hierarchy key 540, which can be stored in read only memory 64 to perform the reorder bits of binary number according to bit hierarchy key step 538. As described previously, a bit hierarchy key 540 can be any ordering of the . . .  $T_1 T_2 T_3 \dots C_2 C_3 \dots D_2 D_3$  536 bits and in general will be selected so that programs most likely to be the subject of timer preprogramming would have a low value compressed code 212, which would minimize key strokes. The ordering of the bit hierarchy key can be determined by the differential probabilities of the various bit combinations as previously discussed. The details of deriving a bit hierarchy key 540 are described relative to bit hierarchy key 120 and the same method can be used for bit hierarchy key 540. For example, the bit hierarchy key might be:

1L <sub>6</sub>	C <sub>4</sub>	...	1L <sub>10</sub>	C <sub>1</sub>	T <sub>1</sub>	C <sub>5</sub>	T <sub>1</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	D <sub>7</sub>	D <sub>8</sub>	D <sub>9</sub>	D <sub>10</sub>	D <sub>11</sub>	D <sub>12</sub>	D <sub>13</sub>	D <sub>14</sub>	
27	26	...	10	9	8	7	6	5	4	3	2	1										

The next step is the combine groups of bits and convert each group into decimal numbers and concatenate into one decimal number step 542. For example, after reordering according to the bit hierarchy key, the code may be 000000001010010000010001001, which could be grouped as 00000000101001000, 0010001001. If these groups of

binary bits are converted to decimal as 328,137 and concatenated into one decimal number, then the resulting decimal number is 328137. The last encoding step is the permute decimal number step 546, which permutes the decimal number according to permutation function 544 that is dependent on the date 548 and in particular the month and year and provides a security feature for the codes. After the permute decimal number step 546, the decimal compressed code  $G_6 \dots G_2 G_1$  550 may, for example, be 238731. These encoded codes are then included in a program guide or calendar as the compressed code indication 212 of FIG. 8.

FIG. 27 is a flowchart of the method for decoding a decimal compressed code into channel, date, time and length 560, which is step 414 of FIG. 23. Once the decimal compressed code  $G_6 \dots G_2 G_1$  550 is entered in step 562, it is necessary to invert the permutation function of steps 544 and 546 of FIG. 26. The first step is the extract day code step 566, which extracts the day code for the program in the decimal compressed code and passes the day code to step 568, which also receives the current day 574 from the clock 576, which is implemented by microcomputer 380 in FIGS. 21 and 22. The clock 576 also sends the current month and year to the permutation function 570, which is dependent on the month and year. Then step 568 performs the function: if day code is same or greater than current day from clock, then use permutation function for month/year on clock, otherwise use permutation function for next month after the month on the clock and use next year if the month on the clock is December. In other words, since there is provision for preprogramming recording for one month or 31 days ahead, if the day for the program is equal to or greater than the current day of the month, then it refers to a day in the present month; otherwise, if the day for the program is less than the current day of the month, it must refer to a program in the next month. The extract day code step 566, which must be performed before the invert permutation of decimal compressed code step 580, is accomplished by a priori knowledge of how the permute decimal number step 546 of FIG. 26 is performed relative to the day code information.

The selected permutation method 578 is used in the invert permutation of decimal compressed code step 580. For the example given above, the output of step 580 would be: 0328137. The next step is the convert groups of decimal numbers into groups of binary numbers and concatenate binary groups into one binary number step 584, which is the inverse of step 542 of FIG. 26 and for the above example would result in the binary code: 00000000010100100001001. Then the bit hierarchy key 588 is used in the reorder bits of binary number according to bit hierarchy key step 586, which inverts step 538 of FIG. 26 to obtain 000000000010110000010001001 for the above example, which is . . .  $T_1 T_2 \dots C_2 C_1 \dots D_2 D_3$  582 corresponding to 536 of FIG. 26. The next step is to group bits to form three binary numbers  $T_{14} \dots T_1$ ,  $C_6 \dots C_1$  and  $D_{14} \dots D_1$  592, which for the example above would be: 4, 9, 19, and which are priority vectors for channel, day and time/length, which in turn are used to lookup channel, day, time and length 604 in priority vector channel (C) table 598, priority vector date (D) table 600 and priority vector time/length (IL) table 602, respectively.

The lookup local channel number step 606 looks up the local channel 612 given the assigned channel number 608, in the assigned/local channel table 610, which is setup by the user via the CII key 322, as explained above. An example of the assigned/local channel table 610 is the right two columns

of the assigned/local channel table 620 of FIG. 28. The correspondence between the assigned channel numbers, such as 624 and 628, and the local channel numbers, such as 626 and 630 is established during setup by the user. For the example, FIG. 28 shows an exact correspondence between the assigned channel number 5 and the local channel number 5. The last step is the append month and year to day to form date step 614. The correct month and year are obtained from step 568 and are again dependent on whether the day code is equal to or greater than the day from the clock or less than the day from the clock. If the day code is equal to or greater than the day from the clock, the month and year as shown on the clock are used, otherwise the next month is used and the next year is used if the clock month is December. The result is the channel, date, time and length (CDTL) 618, which for the above example would be channel 5, Feb. 10, 1990, 7:00PM and 1.5 hours in length.

Another preferred embodiment is an apparatus and method to enable a user to selectively record information designated by a digital compressed code. Specifically this apparatus would allow a user to record for later viewing, detailed information associated with an advertisement or similar brief description of a service, product, or any information including public service information.

The advertisement could be print advertisement or broadcast advertisement on television or any other media, such as radio, electronic networks or bulletin boards. The advertisement would have associated with it a digital code, herein referred to as an I code. In print advertisement the digital code would be printed along with the advertisement. FIG. 29a shows an example print advertisement 650 for an automobile and printed in the advertisement is a decimal code for information (I code) 652. This code can be identified as an I code 652, because the leading digit is a zero, as will be explained below. As shown in FIG. 29a, the use of I codes is very space efficient, which is very important in advertising.

FIG. 29b shows an example television broadcast advertisement 654 with an I code 652. The user would identify this code as a I code 652, because the leading digit is zero. It may be very expensive to run a long advertisement during prime time when the majority of viewers are watching television; however, a short advertisement could be run during prime time with the I code and then the user could enter the I code into instant programmer 300, which would command the recording of the longer advertisement for the automobile during the nonprime time. The additional information could be broadcast early in the morning, for example, between midnight and six o'clock in the morning. At this time the broadcast rates are low and it is economical to broadcast detailed information or advertisements of many items such as automobiles and real estate. It would also be possible to transmit movie previews at that time of night.

The reader of print advertisement, the viewer of television and the consumer of any other media, such as radio, would select what additional information was of interest and enter the associated I code into instant programmer 300, which would then command the recording of the detailed information late at night. The user could then view these at his/her leisure.

The instant programmer 300 can be used for recorder preprogramming for information using I codes; however, there are some important differences when the device is used for I codes.

A primary difference is that I codes that are entered into the instant programmer 300 are used within the next twenty four hours. The user would read, see or hear the advertise-

ment and enter the I code associated with the advertisement into the instant programmer 300, which would then at the right time sometime in the next 24 hours, and generally in the middle of the night, record the advertisement, by tuning to the proper channel and turning recording on and off for a video cassette recorder. In normal recorder preprogramming, using G codes, the instant programmer 300 decodes the television broadcast advertisement 654 into CDTL (channel, date, time, and length). For an I code 652, the instant programmer 300 would decode the I code 652 into CDTL (channel, time and length) only, because the date is known to be in the next twenty four hours. Suppose the time is now June 20th at 6 p.m. If a user enters an I code, which decodes to channel 2, start time 2:00 a.m., and length 10 minutes, then the VCR would start recording on June 21st at 2:00 a.m. for 10 minutes.

The hardware for the instant programmer 300 used with decimal codes for information (I codes) can be identical to the design illustrated in FIGS. 15, 16, 17, 17A, 18, 19, 20, 21 and 22 and described in the associated specification.

The flowcharts for the programs that are stored in the read only memory (ROM) of the microcomputer 380 that execute program entry, review and program cancellation, and record execution are illustrated in FIGS. 23, 24, and 25, respectively for use of G codes for preprogramming a VCR for program recording.

The programs for use of the instant programmer 300 with I codes for recording information according to this preferred embodiment are in general different; however, the program for review and program cancellation (see FIG. 24) and record execution (see FIG. 25) are the same. However, the program that is stored in the read only memory (ROM) of the microcomputer 380 that executes on entry of an I code is different and is shown in FIG. 30. The entry of an I code is determined by inspecting the leading digit of the entered code. If the leading digit is not zero then a G code has been entered, because G codes never have leading zeros, and the flowgraph of FIG. 23 will be executed. If the leading digit is a zero then an I code has been entered. Steps 702, 704, 706, 708 and 710 of FIG. 30 are identical to steps 402, 404, 406, 408 and 410 in FIG. 23. The test for a G code or an I code is done in test whether leading digit is zero step 711, which will either branch to step 412 of FIG. 23 if the entered code is a G code, or continue with the next step of FIG. 30.

The flowchart for entry of the I code in FIG. 30 consists of the following steps: display current date, time and time bars step 702, scan keyboard to determine if I code entered step 704, display I code as it is entered step 706, user checks if correct code entered step 708, user advances or retards start time by three hours by pressing SAVL key 316 or ENTER key 318 step 710, test whether leading digit is zero step 711, user presses ONCE key 310 step 712, microcomputer decodes I code into CDTL step 714, test if conflict with stored programs step 716, set display as channel, start time and duration (time bars) step 718, display "C1 ASH" message step 720, user presses ONCE key 310 step 722, entry not saved step 724, accommodate conflicting entries step 732, user presses CANCEL key 304 step 728, enter program on stack, chronological order step 734, and calculate length of tape required and update time bars step 736. FIG. 30 illustrates the order and relationships between the steps for I code entry. If the user presses WEEKLY key 308 or DAILY (M-1) key 312 instead of the ONCE key 310, then the instant programmer 300 will interpret these as if the ONCE key 310 had been pressed. The stack memory of the enter program on stack in chronological order step 734

allows the user to enter multiple digital codes for information, which will all be decoded and entered in order into the stack for later execution when the proper time arrives.

In order to use I codes with advertisements, the I codes have to first be encoded. FIG. 31 is a flowchart of the method for encoding channel, time and length (C/T/L) for an information broadcast into an I code. This process is done "offline" and can be implemented on a general purpose computer and is done to obtain a I code 854 that can be included in an advertisement, such as shown in FIGS. 29a and 29b.

In general the I codes are encoded to be compressed coded indications, each representative of, and compressed in length from, the combination of separate channel, start time and a length indications. To print advertisement and also in television broadcasts, there is simply not enough area to separately spell out the channel, start time, and length. The I codes solve this problem by encoding channel, start time and length into one compressed digital code.

The first step in one preferred encoding method is enter channel, time and length (C/T/L) and validity period step 812 for the supplemental information associated with an advertisement. The channel, time and length are self explanatory. The validity period is necessary, because the encoding and decoding algorithms have a step in which a scramble occurs. To guarantee that the I code associated with an advertisement will be able to be used, two overlapping scrambling time periods are used. For example suppose that a first scrambling method is constant for two months from January 1st to February 28th and then changes every succeeding two month period. An overlapping and skewed second scrambling method would be constant from February 1st to March 31st and then change every succeeding two month period. For an advertisement that would run from January 20th to February 10, the first scrambling method would be used for encoding and decoding; however, for an advertisement that would run from February 25th through March 9th, then the second scrambling method would be used. Thus, the validity period input at the beginning of the encoding process specifies which scrambling method to use.

The next step is the lookup assigned channel number step 816, which substitutes an assigned channel number 822 for each channel 818 of the input C/T/L 814. Often, for example for network broadcast channels, such as channel 2, the assigned channel number is the same; however, for a cable channel such as HBO a channel number is assigned and is looked up in a cable assigned channel table 820, which would essentially be the same as the first two columns of the table of FIG. 28. Next, the lookup priority of channel, time and length in priority vector table step 824 performs a lookup in priority vector channel (C) table 826 and priority vector time,length (T/L) table 830 using the indices of channel and time/length, respectively, to produce the vector  $C_p, T_{1p}, T_{2p}, \dots, T_{np}$ . The use of a combined time/length (T/L) table to set priorities recognizes that there may be some relationship between these combinations for additional information. For example, at 2 AM movie previews could be broadcast and be somewhat longer than other information, but very popular. Alternatively, it is possible to have separate priority tables for time and length.

The channel priority table is ordered so that in general the least frequently used channels for I codes have high priority numbers and the most frequently used channels for I codes have a low priority number, which contributes to deriving shorter I codes for the most popular supplemental information broadcasts. Note that because the information broad-

casts are least expensive it done on off hours on seldom used channels, that it is likely that the channels with the lowest priority numbers for G codes may have the highest priority numbers for I codes. For example, a short G code may be for channel 2 on Monday at 8 p.m. for 1 hour during prime time, while a short I code may be for channel 17 at 4 a.m. for 5 minutes. The typical information broadcast may be only about 3 to 5 minutes compared to the typical 30 to 60 minute program. An example of the data that is in the priority vector C table 826 follows.

channel	4	7	2	3	5	6	11	13	...
priority	0	1	2	3	4	5	5	7	...

The priority of the start times and length of the information broadcasts corresponding to I codes are conceivably the inverse of the priorities of the G codes, because G codes are arranged so that prime time programs will have the shortest G codes. In the case of I codes, they would be arranged to have the shortest codes when the broadcast time is least expensive, which is certainly not prime time. Thus, if the G codes are encoded for prime time, then the I codes are encoded for nonprime time or the inverse of prime time. The priority for time and length could be arranged in a matrix that would assign a priority to each combination of start times and information broadcast lengths so that more popular combinations of start time and length would have a low priority number and less popular combinations would have a high priority number, which also contributes to deriving shorter codes for the most popular supplemental information broadcasts. For example, a partial priority vector T/L table 830 might appear as follows.

Length (hrs)	Priority T/L table					...
	2.00 hrs	3.00 sm	3.30 sm	4.00 hrs	...	
.1	8	4	7	10	...	
.2	2	15	13	18	...	
.3	20	39	17	50	...	

Alternately as indicated before, separate priority tables could be constructed for start times and broadcast length with the lowest priority numbers given to the most likely start times for I code broadcasts and most likely broadcast lengths. Suppose the channel, time and length (C/T/L) 814 is channel 5, 3:00 am and 0.3 hours in length, then the  $C_p, T_{1p}, T_{2p}$  for the above example would be 4 19. The next step is the convert  $C_p, T_{1p}, T_{2p}$  to binary numbers and concatenate them into one binary number step 834, resulting in the data word  $\dots, T_{1p}, T_{2p}, \dots, C_p, C_{1p}, \dots, C_{np}$ . For the example given above, converting the  $\dots, T_{1p}, T_{2p}, \dots, C_p, C_{1p}, \dots, C_{np}$  word to binary would yield the two binary numbers:  $\dots, 0010011, \dots, 0100$ . The number of binary bits to use in each conversion is determined by the number of combinations involved. This could vary depending on the implementation; however one preferred embodiment would use eight bits for  $C_{np}$  denoted as  $C_R, C_1, C_2, C_3, C_4, C_5, C_6, C_7$ , which would provide for 256 channels, and fourteen bits for  $T_{1p}, T_{2p}$  denoted as  $T_{1,1}, \dots, T_{1,2}, T_{2,1}, \dots, T_{2,2}$ , which would provide for start times spaced every 5 minutes over 24 hours and information broadcasts in increments of 5 minute lengths for information broadcasts up to 3 hours in length. This requires about  $288 \times (36+20) =$

16,128 combinations, which are provided by the  $2^{14} \times 16 = 16,384$  binary combinations. Altogether there are  $8 \times 14 = 22$  bits of information  $T_{14} \dots T_2, T_1, C_8 \dots C_1$ . For the above example padding each number with zeros and then concatenating them would yield the 22 bit binary number: 00000000010011000000100.

The next step is to use bit hierarchy key 840, which can be stored in read only memory 64 to perform the reorder bits of binary number according to bit hierarchy key step 838. A bit hierarchy key 840 can be any ordering of the  $T_{14} \dots T_2, T_1, C_8 \dots C_1$ , 836 bits and in general will be selected so that information broadcasts most likely to be the subject of timer programming would have a low value I code 854, which would minimize keystrokes. The ordering of the bit hierarchy key can be determined by the differential probabilities of the various bit combinations as previously discussed. The details of deriving a bit hierarchy key 840 were described relative to bit hierarchy key 120 and the same method can be used for bit hierarchy key 840. For example, the bit hierarchy key might be:

$T_{14}$	$C_8$	...	$T_1$	$C_1$	$T_{14}$	$C_8$	...	$T_1$	$C_1$
22	21		4	3	2	1			

The next step is the insert validity period code step 841. The validity period code 845 must be at least one bit, but could be more, and is set by the selected scramble function step 844, which is dependent on the validity period of the information broadcast, as explained above. The select scramble function step 844 also selects an associated scramble method, which provides security for the resulting I code 854. The validity period code 845 is inserted into the I code, and is used to designate the scramble method to be used during decoding.

FIG. 33 is an illustration of the problem addressed by the validity period code 845. Suppose a particular scramble method is constant during time span 930 and then changes at the start of time span 932, and each succeeding two month time span. For most advertisements, the I code 854 would have to be constant for a period of time, for example a week for I codes in weekly publications. If the time spans 930 and 932 are two months as shown in FIG. 33, then a one week validity period might overlap both time spans 930 and 932, which would mean that the scramble method would change during the validity period. To compensate for this, a skewed and overlapping set of time spans for a second scramble method is provided. For example, time span 934 and time span 936, which are skewed from time span 930 and time span 932 by one month. The scramble time spans 930, 932 and so on, can be designated by a validity period code "0". The offset scramble time spans 934, 936 and so on can be designated by a "1". Suppose there is a validity period 938 for one week for a I code 854, then the scramble method selected would be those valid during time span 930, time span 932 and so on and the validity period code for that validity period would be set to "0", as shown by validity period codes 944. The validity period code would also be "0" for the validity period 942. However, for validity period 940, the validity period code would be set to "1", because that corresponds to the scramble method that is constant during time span 934.

Note that if only two skewed time spans are used and the validity period code is placed in the least significant bit of the binary word in step 841, and the least significant digit is not scrambled in step 846, then once the I code is derived it

is possible when decoding the I code to determine the validity period code merely by inspecting whether the I code is even or odd.

The next step is the combine groups of bits and convert each group into decimal numbers and concatenate into one decimal number step 842, for example, after reordering according to the bit hierarchy key and insertion of the validity period code (suppose its "1" in this example, because the validity period is February 25th to March 9th, for which a validity period code of 1 would be used as shown in FIG. 33), the code may be 00000000110000000010011, if which could be grouped as 0000000011,0000000010011. If these groups of binary bits are converted to decimal as 3,19 and concatenated into one decimal number, then the resulting decimal number is 319. The next encoding step is the scramble decimal number step 846, which scrambles the decimal number according to scramble function 844 that is dependent on the validity period 848, such as February 25th through March 9th, for the information broadcast and provides a security feature for the codes. After the scramble decimal number step 846, the decimal code  $I_{14} \dots I_1, C_8 \dots C_1$  850 may, for example, be 139. The last step is to insert a zero (0) for the first digit step 852, so that the code is distinguishable to the instant programmer 300 as a I code 854. The result for the example would be 0139. These encoded codes are then included in an advertisement, for example as in the I code 652 of FIGS. 29a and 29b.

FIG. 32 is a flowchart 860 of the method for decoding an I code into channel, time and length, which is step 714 of FIG. 30. Note that step 711 of FIG. 30 has already determined that the entered code is an I code versus a G code, because the first digit is a zero. First, the I code  $I_{14} \dots I_1, C_8 \dots C_1$  862 is entered. Then the zero is deleted in the remove leading zero step 864 to obtain  $I_{14} \dots I_1, C_8 \dots C_1$  865.

Next, it is necessary to invert the scramble method of steps 844 and 846 of FIG. 31. The first step is the extract validity period code step 866. The validity period code 867 indicates, which of two skewed in time scrambling methods to use. The scramble method 878 selected by scramble function 870 also depends on clock 876, which is implemented by microcomputer 380 in FIGS. 21 and 22. The clock 876 has the current time, day, month and year. The selected scramble method 878 is used in the invert scramble of I code step 880. For the example given above, the output of step 880 would be 319. The next step is the convert groups of decimal numbers into groups of binary numbers and concatenate binary groups into one binary number step 884, which is the inverse of step 842 of FIG. 31 and for the above example would result in the binary code: 0000000011000000001001. Then the validity period code 867 would be deleted in step 885, which inverts step 841 of FIG. 31, the result being: 0000000011000000001001. Then the bit hierarchy key 888 is used in the reorder bits of binary number according to bit hierarchy key step 886, which inverts step 838 of FIG. 31 to obtain 0000000001001000000100 for the above example, which is  $\dots T_{14}, T_{13}, \dots T_2, T_1, C_8, \dots C_1, I_{14}, I_1, C_8, \dots C_1, I_{14}, I_1, C_8, \dots C_1$  882 corresponding to 836 of FIG. 31. The next step is to group bits to form two binary numbers  $T_{14}, T_1, C_8$  and convert to decimal numbers step 890 resulting in  $C_{p_1}, T_{14}, I_{14}, I_1, C_8, \dots C_1, I_{14}, I_1, C_8, \dots C_1$  892, which for the example above would be 1, 19, and which are priority vectors for channel and time-length, which in turn are used to lookup channel, time and length 904 in priority vector channel (C) table 898 and priority vector time-length (TL) table 902, respectively. For the above example, this would result in looking up channel 5 and time-length of 3 a.m./.03 hours.

The lookup local channel number step 906 looks up the local channel 912 given the assigned channel number 908,

in the assigned/local channel table 910, which is setup by the user via the CII key 322, as explained above.

Another preferred method of encoding and decoding the I codes is the following, which is similar to the foregoing except where noted. Channel, time and length priority tables would be used to encode and decode the I codes, as described before. The key difference is that the bit hierarchy is no longer defined in base 2 arithmetic. Rather it is defined in a generalized base arithmetic as shown in the following table:

No. of Digits	Validity Per.				#
	Ch	Time	Len	Code Bits	
1	1	3	2	0 <sup>a</sup>	6 TIL
2	16	3	2	0 <sup>a</sup>	96 CCCC
3	16	30	2	0 <sup>a</sup>	960 TTTT
4	32	75	4	0 <sup>a</sup>	9600 TCTT
5	64	60	8	1	921600 TCTS
6	64	380	20	1	9216000 TCTT
7	128	720	50	1	92160000 LLIC
8	128	1440	250	1	921600000 LLIT

<sup>a</sup>Validity period code bit assumed to be equal to zero.

C = channel bit

T = start time bit

L = length bit

S = validity period code bit

For example, if only one digit is used, there are one channel (1'C), three start times (3'T's) and two length (2'L's), i.e. 6 combinations. It is assumed that the I code before appending the leading zero has only one digit and that in this case both the encoding and decoding methods understand that the validity period code is "0". With two digits, there are in addition 16 times more 'C's (i.e. 16 'C's), so that there are now  $3 \times 2 \times 16 = 96$  combinations in the first 2 digits. With 3 digits, there are now 10 times more 'T's so that there are now 3 (from digit 1)  $\times$  10 (from digit 3)  $\times$  30 T's. The total number of combinations equals  $3 \times 2 \times 16 \times 10 \times 3 = 9600$  in the first 3 digits. With four digits, there are now 2 more time 'C's, 2 more times L's and 2.5 times more T's, so that the number of combinations increases by  $2 \times 2 \times 2.5 = 10$  times. There are now 96000 combinations in the first 4 digits. With five digits, there are 2 more times C, 1.2 more times L's, 2 more times T's and an extra bit for scrambling so that there are now  $2 \times 1.2 \times 2 \times 2.5 = 9.6$  times more combinations = 96000  $\times$  9.6 = 921600 combinations. One way to obtain a non-integral number of times such as 1.2 or 1.25 or 2.5 times is essentially by providing a table which defines the range of values for each number of digits that corresponds to the above table.

Thus, steps 834 and 838 in FIG. 31 would be implemented in this preferred embodiment in the manner indicated above and there are other subtle changes such as the handling of the assumed validity period code as indicated above for cases with four or fewer digits in the I code not counting the leading zero. I code decoding would be the reverse of the encoding method.

An example of the encoding to reduce the number of digits in the I code is shown below. In this example, suppose one variable is represented by the digits DA<sub>1</sub>, DA<sub>2</sub> and DB, where DA<sub>1</sub> ranges from 0 to 2 and DA<sub>2</sub> ranges from 0 to 9 and another variable DB ranges from 0 to 3, so the total number of values being encoded is  $2^4 \times 10 = 160$ . It is possible to represent the first variable by two digits and the second variable by one digit; however, that is inefficient, because it would require the listing of three digits. The number of combinations of the two variables is

only  $2^4 \times 1 = 160$ , so it is possible to represent the combination of the variables in only 2 binary coded decimals. The desire is to encode the DA<sub>1</sub>, DA<sub>2</sub> and DB, which are 3 digits into two binary coded decimal digits d<sub>1</sub> and d<sub>2</sub>, where the permissible values of d<sub>1</sub> and d<sub>2</sub> range only between 0 and 9.

This is possible as shown in the table below, where the encoding algorithm is the following:

	$A1 \times 2^3 + A2 \times 2^2 + DA_1 \times 2^1$
16	then A1=DA <sub>1</sub> unless DB=2 & DA <sub>2</sub> =2.
15	then A1=DA <sub>2</sub>
14	$B1 \times 2^3 + B2 \times 2^2 + DB = DB$ unless DB=2 & DA <sub>2</sub> =2.
13	then B2=2 <sup>4</sup> -B1+2 <sup>3</sup> -DB-2

The resulting binary coded decimals are denoted d<sub>2</sub>, which equals  $A1 \times 2^3 + A2 \times 2^2 + DA_1 \times 2^1$  and ranges from 0 to 9, and d<sub>1</sub>, which ranges from 0 to 9 and equals A1.

Once encoded, the binary coded decimals d<sub>1</sub> and d<sub>2</sub> can be decoded by first representing them in binary form and then deriving DA<sub>1</sub>, DA<sub>2</sub> and DB as follows:

DA <sub>1</sub> , DA <sub>2</sub>	DB	d <sub>2</sub>		d <sub>1</sub>		Decimal Encoding				
		A3	A2	B2	B1	A1	d <sub>2</sub>	d <sub>1</sub>		
0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	1	0	1	0	1
2	0	0	0	0	0	2	0	2	0	2
3	0	0	0	0	0	3	0	3	0	3
4	0	0	0	0	0	4	0	4	0	4
5	0	0	0	0	0	5	0	5	0	5
6	0	0	0	0	0	6	0	6	0	6
7	0	0	0	0	0	7	0	7	0	7
8	0	0	0	0	0	8	0	8	0	8
9	0	0	0	0	0	9	0	9	0	9
10	0	0	0	1	0	0	0	4	0	0
11	0	0	0	1	0	1	1	4	1	1
12	0	0	0	1	0	2	4	2	4	2
13	0	0	0	1	0	3	4	3	4	3
14	0	0	0	1	0	4	4	4	4	4
15	0	0	0	1	0	5	4	5	4	5
16	0	0	1	0	0	6	0	4	0	0
17	0	0	1	0	0	7	0	5	0	0
18	0	0	1	0	0	8	4	8	4	8
19	0	0	1	0	0	9	4	9	4	9
20	0	0	1	0	0	0	8	0	8	0
21	0	0	1	0	0	1	8	1	8	1
22	0	0	1	0	0	2	8	2	8	2
23	0	0	1	0	0	3	8	3	8	3
24	0	0	1	0	0	4	8	4	8	4
25	0	1	0	0	0	0	5	0	0	0
26	0	1	0	0	0	1	1	1	1	1
27	0	1	0	0	0	2	1	2	1	2
28	1	0	0	0	0	3	1	3	1	3
29	1	0	0	0	0	4	1	4	1	4
30	1	0	0	0	0	5	1	5	1	5
31	1	0	0	0	0	6	1	6	1	6
32	1	0	0	0	0	7	1	7	1	7
33	1	0	0	0	0	8	1	8	1	8
34	1	0	0	0	0	9	0	9	0	9
35	1	0	0	0	0	0	5	0	0	0
36	1	0	0	1	0	1	5	1	5	1
37	1	0	0	1	0	2	5	2	5	2
38	1	0	0	1	0	3	5	3	5	3
39	1	0	0	1	0	4	5	4	5	4
40	1	0	0	1	0	5	5	5	5	5
41	1	0	0	1	0	6	5	6	5	6
42	1	0	0	1	0	7	5	7	5	7
43	1	0	0	1	0	8	5	8	5	8
44	1	0	0	1	0	9	5	9	5	9
45	1	0	0	1	0	0	0	0	0	0
46	1	0	0	1	0	1	1	1	1	1
47	1	0	0	1	0	2	1	2	1	2
48	1	0	0	1	0	3	1	3	1	3
49	1	0	0	1	0	4	1	4	1	4
50	1	0	0	1	0	5	1	5	1	5
51	1	0	0	1	0	6	1	6	1	6
52	1	0	0	1	0	7	1	7	1	7
53	1	0	0	1	0	8	1	8	1	8
54	1	0	0	1	0	9	0	9	0	9
55	1	0	0	1	0	0	0	0	0	0
56	1	0	1	0	0	1	1	1	1	1
57	1	0	1	0	0	2	1	2	1	2
58	1	0	1	0	0	3	1	3	1	3
59	1	0	1	0	0	4	1	4	1	4
60	1	0	1	0	0	5	1	5	1	5
61	1	0	1	0	0	6	1	6	1	6
62	1	0	1	0	0	7	1	7	1	7
63	1	0	1	0	0	8	1	8	1	8
64	1	0	1	0	0	9	0	9	0	9
65	1	1	0	0	0	0	0	0	0	0
66	1	1	0	0	0	1	1	1	1	1
67	1	1	0	0	0	2	1	2	1	2
68	1	1	0	0	0	3	1	3	1	3
69	1	1	0	0	0	4	1	4	1	4
70	1	1	0	0	0	5	1	5	1	5
71	1	1	0	0	0	6	1	6	1	6
72	1	1	0	0	0	7	1	7	1	7
73	1	1	0	0	0	8	1	8	1	8
74	1	1	0	0	0	9	0	9	0	9
75	1	1	0	1	0	0	0	0	0	0
76	1	1	0	1	0	1	1	1	1	1
77	1	1	0	1	0	2	1	2	1	2
78	1	1	0	1	0	3	1	3	1	3
79	1	1	0	1	0	4	1	4	1	4
80	1	1	0	1	0	5	1	5	1	5
81	1	1	0	1	0	6	1	6	1	6
82	1	1	0	1	0	7	1	7	1	7
83	1	1	0	1	0	8	1	8	1	8
84	1	1	0	1	0	9	0	9	0	9
85	1	1	1	0	0	0	0	0	0	0
86	1	1	1	0	0	1	1	1	1	1
87	1	1	1	0	0	2	1	2	1	2
88	1	1	1	0	0	3	1	3	1	3
89	1	1	1	0	0	4	1	4	1	4
90	1	1	1	0	0	5	1	5	1	5
91	1	1	1	0	0	6	1	6	1	6
92	1	1	1	0	0	7	1	7	1	7
93	1	1	1	0	0	8	1	8	1	8
94	1	1	1	0	0	9	0	9	0	9
95	1	1	1	1	0	0	0	0	0	0
96	1	1	1	1	0	1	1	1	1	1
97	1	1	1	1	0	2	1	2	1	2
98	1	1	1	1	0	3	1	3	1	3
99	1	1	1	1	0	4	1	4	1	4
100	1	1	1	1	0	5	1	5	1	5
101	1	1	1	1	0	6	1	6	1	6
102	1	1	1	1	0	7	1	7	1	7
103	1	1	1	1	0	8	1	8	1	8
104	1	1	1	1	0	9	0	9	0	9
105	1	1	1	1	1	0	0	0	0	0
106	1	1	1	1	1	1	1	1	1	1
107	1	1	1	1	1	2	1	2	1	2
108	1	1	1	1	1	3	1	3	1	3
109	1	1	1	1	1	4	1	4	1	4
110	1	1	1	1	1	5	1	5	1	5
111	1	1	1	1	1	6	1	6	1	6
112	1	1	1	1	1	7	1	7	1	7
113	1	1	1	1	1	8	1	8	1	8
114	1	1	1	1	1	9	0	9	0	9
115	1	1	1	1	1	0	0	0	0	0
116	1	1	1	1	1	1	1	1	1	1
117	1	1	1	1	1	2	1	2	1	2
118	1	1	1	1	1	3	1	3	1	3
119	1	1	1	1	1	4	1	4	1	4
120	1	1	1	1	1	5	1	5	1	5
121	1	1	1	1	1	6	1	6	1	6
122	1	1	1	1	1	7	1	7	1	7
123	1	1	1	1	1	8				

-continued

DA <sub>2</sub>	DA <sub>2</sub>	d <sub>1</sub>		Decimal Encoding				
		d <sub>3</sub>	d <sub>4</sub>	B1	A1	d <sub>2</sub>	d <sub>1</sub>	
22	1	-	1	0	1	2	9	2
23	2	-	0	0	1	3	9	3
24	1	-	0	0	1	4	9	4
0	2	0	0	1	0	0	2	0
1	2	0	0	1	0	1	2	1
2	2	0	0	1	0	2	2	2
3	2	0	0	1	0	3	2	3
4	2	0	0	1	0	4	2	4
5	2	0	0	1	0	5	2	5
6	2	0	0	1	0	6	2	6
7	2	0	0	1	0	7	2	7
8	2	0	0	1	0	8	2	8
9	2	0	0	1	0	9	2	9
10	2	0	1	1	0	0	6	0
11	2	0	1	1	0	1	1	1
12	2	0	1	1	0	2	0	2
13	2	0	1	1	0	3	0	3
14	2	0	1	1	0	4	0	4
15	2	0	1	1	0	5	0	5
16	2	0	1	1	0	6	0	6
17	2	0	1	1	0	7	0	7
18	2	0	1	1	0	8	0	8
19	2	0	1	1	0	9	0	9
20	2	1	0	0	0	5	3	5
21	2	1	0	0	0	6	9	6
22	2	1	0	0	0	7	9	7
23	2	1	0	0	0	8	9	8
24	2	1	0	0	0	9	9	9
0	2	0	0	1	1	0	3	0
1	2	0	0	1	1	1	3	1
2	2	0	0	1	1	2	3	2
3	2	0	0	1	1	3	3	3
4	2	0	0	1	1	4	3	4
5	2	0	0	1	1	5	3	5
6	2	0	0	1	1	6	3	6
7	2	0	0	1	1	7	3	7
8	2	0	0	1	1	8	3	8
9	2	0	0	1	1	9	3	9
10	2	0	0	1	1	0	7	0
11	2	0	1	1	1	1	7	1
12	2	0	1	1	1	2	7	2
13	2	0	1	1	1	3	7	3
14	2	0	1	1	1	4	7	4
15	2	0	1	1	1	5	7	5
16	2	0	1	1	1	6	7	6
17	2	0	1	1	1	7	7	7
18	2	0	1	1	1	8	7	8
19	2	0	1	1	1	9	7	9
20	2	0	1	1	1	5	9	5
21	2	1	0	0	1	6	9	6
22	2	1	0	0	1	7	9	7
23	2	1	0	0	1	8	9	8
24	2	1	0	0	1	9	9	9

DA<sub>2</sub> = A3<sup>21</sup> + A1<sup>25</sup>DA<sub>2</sub> = A1 unless A3 = 1 and A1  $\geq$  5, then DA<sub>2</sub> = A1 - 5DB = B1<sup>21</sup> + B1<sup>25</sup> unless A1  $\geq$  5, then DB = (B1 + 1)<sup>21</sup> + B1<sup>25</sup>

Note if the weights of the A3, A2, B2 and B1 bits are 20, 10, 50, and 25, that the weighted sum of the bits plus the A1 digit sequence properly from 0 through 99, for the example table above, except for what should be the weighted sums 70 through 74 and 95 through 99 combinations, which have instead a weighted sum of 25 through 29 and 50 through 54, respectively. This results in the logic above that recognizes that DA<sub>1</sub> never exceeds the value 1. This is used to advantage to keep d<sub>2</sub> within a binary coded decimal value of 0 to 9 by replacing what should be a 1 in B2 with a zero and adding 5 to A1, thereby resulting in the difference of 5-50=45 between the expected 70 and resulting 25 and the expected 95 and resulting 50, for example. As shown in the logic above, simple tests determine the proper encoding and decoding.

In summary the apparatus and methods described enable a user to selectively record additional information associated with a printed or broadcast advertisement, which would be broadcast on a television channel at a later time. The user enters the digital code (I code) associated with an advertisement into a unit with a decoding means which automatically converts the I code into CTL (channel, time and length). The unit within a twenty four hour period activates a VCR to record information on the television channel at the right start time for the proper length of time. The additional information could be broadcast on a television channel early in the morning, for example, between midnight and six o'clock in the morning, when the cost of broadcast time is low and it is economical to broadcast detailed information or advertisements of many items, such as automobiles, real estate and movie previews. The user can then view this information at his/her leisure. This invention will allow the user an unprecedented capability to control access to desired information without having to be continually glued to the television. It will also provide a new and cost effective means for advertisers to explain their goods and services.

It is thought that the apparatus and method for using compressed codes for scheduling broadcast information recording of the present invention and many of its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction and arrangement of the parts thereof without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred or exemplary embodiment thereof.

What is claimed is:

1. An apparatus for using compressed codes for information broadcast recording that comprises:

means for entering compressed codes each having at least one digit and each representative of, and compressed in length from, the combination of a proper subset of the set of channel, date, time-of-day and length commands for an information broadcast; and

means for decoding a compressed code having at least one digit into a proper subset of the set of channel, date, time-of-day and length commands.

2. The apparatus for using compressed codes of claim 1 wherein said compressed code:

has a length less than the length of the concatenation of said incorporated proper subset of the set of channel, date, time-of-day and length commands.

3. The apparatus for using compressed codes of claim 1 wherein said compressed code:

comprises one or more alphanumeric characters.

4. The apparatus for using compressed codes of claim 1 wherein:

said means for decoding expands each of said compressed codes into an individual, proper subset of the set of channel, date, time-of-day and length commands for an individual information broadcast.

5. The apparatus for using compressed codes of claim 1 wherein said means for entering a compressed code comprises:

means for remote control that comprises the means for entering and a signal transmit means for communicating said compressed code to said means for decoding.

6. The apparatus for using compressed codes of claim 1 wherein said means for entering a compressed code comprises a keyboard.

7. The apparatus for using compressed codes of claim 5 further comprising:

means for recording coupled to said means for decoding;

8. The apparatus for using compressed codes of claim 7 further comprising:

a clock for providing an output as a function of time; and said means for decoding performing the decoding as a function of said clock output;

9. The apparatus for using compressed codes of claim 8 wherein said means for recording comprises:

said clock;

means for selecting a channel to record in response to said decoded channel commands;

means for turning said means for recording on in response to comparison of said decoded time-of-day commands with said clock output; and

means for turning said means for recording off in response to comparison of the record on time with said decoded length commands.

10. The apparatus for using compressed codes of claim 1 further comprising:

means for recording;

means for remote control, wherein the means for remote control comprises the means for entering said compressed codes and the means for decoding said compressed codes; and

a clock for providing an output as a function of time coupled to said means for decoding.

11. The apparatus for using compressed codes of claim 10 wherein:

said means for decoding performs the decoding as a function of said clock output.

12. The apparatus for using compressed codes of claim 11 further comprising:

means for selecting a channel to record in response to said decoded channel commands;

means for turning said means for recording on in response to comparison of said decoded time-of-day commands with said clock output; and

means for turning said means for recording off in response to comparison of the record on time with said decoded length commands.

13. The apparatus for using compressed codes of claim 12 wherein said means for remote control comprises:

signal transmit means for transmitting commands to said means for recording;

means for selecting a channel to record in response to said decoded channel commands;

means for turning said means for recording on in response to comparison of said decoded time-of-day commands with said clock output; and

means for turning said means for recording off in response to comparison of the record on time with said decoded length commands.

14. The apparatus for using compressed codes of claim 12 further comprising:

means for transmitting a proper subset of the set of channel, date, time-of-day and length commands from said means for remote control to said means for recording;

15. The apparatus for using compressed codes of claim 14 wherein said means for recording comprises:

a clock for providing an output as a function of time;

means for selecting a channel to record in response to said decoded channel commands;

means for turning said means for recording on in response to comparison of said decoded time-of-day commands with said clock output; and

means for turning said means for recording off in response to comparison of the record on time with said decoded length commands.

16. The apparatus for using compressed codes of claim 1 further comprising:

means for remote control, wherein the means for remote control comprises the means for entering said compressed codes and the means for decoding said compressed codes.

17. The apparatus for using compressed codes of claim 16 wherein:

said means for remote control comprises a universal remote control capable of learning protocols of a different remote controller with which said means for universal remote control interfaces.

18. The method for using compressed codes for information broadcast recording that comprises:

receiving compressed codes, each having at least one digit and each representative of, and compressed in length from, the combination of a proper subset of the set of channel, date, time-of-day and length commands for an information broadcast; and

decoding a compressed code having at least one digit into a proper subset of the set of channel, date, time-of-day and length commands.

19. The method for using compressed codes of claim 18 further comprises:

decoding each of said compressed codes into a individual, proper subset of the set of channel, date, time-of-day and length commands for an individual information broadcast.

20. The method for using compressed codes of claim 18 further comprises:

receiving a compressed code in a remote control and transmitting said compressed code to said means for decoding using said remote control.

21. The method for using compressed codes of claim 20 wherein the step of decoding is performed as a function of a clock output.

22. The method for using compressed codes of claim 21 further comprising:

selecting a channel to record in response to said decoded channel commands;

turning a recorder on in response to comparison of said decoded time-of-day commands with said clock output; and

turning the recorder off in response to comparison of the record on time with said decoded length commands.

23. The method for using compressed codes of claim 18 further comprising:

using a remote control to receive and decode the compressed codes.

24. The method for using compressed codes of claim 23 wherein the step of decoding is performed as a function of a clock output.

25. The method for using compressed codes of claim 24 wherein said remote control transmits commands to a recorder:

selecting a channel to record in response to said decoded channel commands;

turning a recorder on in response to comparison of said decoded time-of-day commands with said clock output; and  
 turning the recorder off in response to comparison of the record on time with said decoded length commands.  
 26. The method for using compressed codes of claim 24 further comprising:  
 transmitting a proper subset of the set of channel, date, time-of-day and length commands from said remote control to a recorder.  
 27. The method for using compressed codes of claim 26 further comprising:  
 selecting a channel to record in response to said decoded channel commands;  
 turning a recorder on in response to comparison of said decoded time-of-day commands with said clock output; and  
 turning the recorder off in response to comparison of the record on time with said decoded length commands.  
 28. The method for using compressed codes of claim 18 further comprising; using a universal remote control capable of learning protocols of a different remote controller with which said universal remote control interfaces to receive and decode the compressed codes.

29. An apparatus for using compressed codes for information broadcast recording that comprises:

an interface that receives compressed codes each having at least one digit and each representative of, and compressed in length from, the combination of a proper subset of the set of channel, date, time-of-day and length commands for an information broadcast; a decoder that decodes a compressed code having at least one digit into a proper subset of the set of channel, date, time-of-day and length commands.

30. The apparatus for using compressed codes of claim 29 wherein said decoder comprises:

a logic circuit implemented using hardware, software or any combination thereof.

31. The apparatus for using compressed codes of claim 29 wherein said interface comprises:

a remote control that comprises the interface and a signal transmitter that communicates said compressed code to said decoder for decoding.

32. The apparatus for using compressed codes of claim 31 further comprising:

a recorder that comprises said decoder.

33. The apparatus for using compressed codes of claim 29 wherein the interface comprises a keyboard.

34. The apparatus for using compressed codes of claim 32 further comprising:

a clock coupled to said decoder.

35. The apparatus for using compressed codes of claim 34 wherein:

said decoder performs the decoding as a function of said clock output.

36. The apparatus for using compressed codes of claim 35 wherein said recorder further comprises:

channel selector that selects a channel to record in response to said decoded channel commands; recorder controller that turns recording on in response to comparison of said decoded time-of-day commands with said clock output and turns recording off in response to comparison of the record on time with said decoded length commands.  
 37. The apparatus for using compressed codes of claim 29 further comprising a remote control, wherein:  
 said remote control comprises the interface and decoder; and  
 a clock providing output as a function of time is coupled to said remote control.  
 38. The apparatus for using compressed codes of claim 37 wherein:  
 said decoder performs the decoding as a function of said clock output.  
 39. The apparatus for using compressed codes of claim 38 further comprising:  
 a transmitter that transmits commands from said remote control to a recorder.  
 40. The apparatus for using compressed codes of claim 39 wherein said remote comprises:  
 channel selector that selects a channel to record in response to said decoded channel commands; recorder controller that turns recording on in response to comparison of said decoded time-of-day commands with said clock output and turns recording off in response to comparison of the record on time with said decoded length commands.  
 41. The apparatus for using compressed codes of claim 38 further comprising:  
 a recorder; and  
 a transmitter that transmits a proper subset of the set of channel, date, time-of-day and length commands from said remote control to said recorder.  
 42. The apparatus for using compressed codes of claim 41 wherein said recorder comprises:  
 a clock;  
 channel selector that selects a channel to record in response to said decoded channel commands; recorder controller that turns recording on in response to comparison of said decoded time-of-day commands with said clock output and turns recording off in response to comparison of the record on time with said decoded length commands.  
 43. The apparatus for using compressed codes of claim 29 further comprising a remote control, wherein:  
 said remote control comprises a universal remote control capable of learning protocols of a different remote controller with which said universal remote control interfaces; and  
 said remote control comprises the interface and decoder.



US005848397A

**United States Patent** [19]

Marsh et al.

[11] **Patent Number:** **5,848,397**[45] **Date of Patent:** **Dec. 8, 1998****[54] METHOD AND APPARATUS FOR SCHEDULING THE PRESENTATION OF MESSAGES TO COMPUTER USERS**[75] **Inventors:** Brian D. Marsh; Jon D. McAuliffe, both of New York, N.Y.[73] **Assignee:** Juno Online Services, L.P., New York, N.Y.[21] **Appl. No.:** 636,745[22] **Filed:** **Apr. 19, 1996**[51] **Int. Cl.6** **G06F 17/60**[52] **U.S. Cl.** **705/14; 705/26; 705/30**[58] **Field of Search** **705/1, 7, 8, 9, 705/10, 14, 26, 27, 30; 707/10, 501, 573; 345/326, 327, 329, 339, 340, 343, 344, 347; 395/200.3, 200.31, 200.33, 200.42, 200.43, 200.47, 200.49, 200.7****[56] References Cited****U.S. PATENT DOCUMENTS**

4,602,279	7/1989	Freeman	.....	348/10
4,992,940	2/1991	Dworkin	.....	705/26
5,093,918	3/1992	Ilycan et al.	.....	395/200.45
5,105,184	4/1992	Pirani et al.	.....	345/115
5,177,680	1/1993	Isukino et al.	.....	704/1
5,220,501	6/1993	Lawlor et al.	.....	380/24
5,233,533	8/1993	Edstrom et al.	.....	705/8
5,241,465	8/1993	Oba et al.	.....	705/8
5,265,033	11/1993	Vajk et al.	.....	395/200.36
5,283,731	2/1994	Lalonde et al.	.....	705/1
5,283,856	2/1994	Gross et al.	.....	395/5.1
5,305,195	4/1994	Murphy	.....	705/1
5,319,455	6/1994	Hoarty et al.	.....	348/7
5,347,632	9/1994	Filipp et al.	395/200.32	
5,353,218	10/1994	De Tapa et al.	.....	705/14
5,361,393	11/1994	Rossillo	.....	395/651
5,377,354	12/1994	Scannell et al.	395/673	
5,404,505	4/1995	Levinson	.....	707/10

5,414,773	5/1995	Hanselmann	.....	380/49
5,426,594	6/1995	Wright et al.	.....	395/200.36
5,426,806	6/1995	Moskowitz	.....	370/400
5,434,978	7/1995	Dockter et al.	.....	395/200.6
5,442,771	8/1995	Filipp et al.	.....	395/200.49
5,446,919	8/1995	Wilkins	.....	455/6.2
5,483,466	1/1996	Kawashara et al.	.....	395/200.33
5,664,948	9/1997	Dimitriadis et al.	.....	434/307 R

**OTHER PUBLICATIONS**

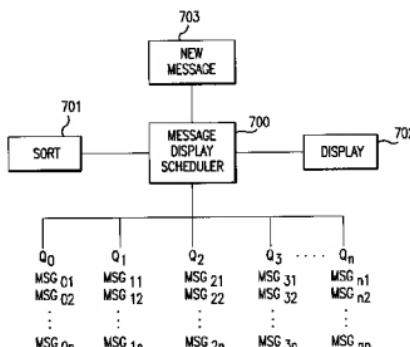
Williamson; "This E-mail Message is Brought to You By ...", *Advertising Age*, v66 n16; Apr. 17, 1995; p 16. "ZD Net Celebrates First Year of Web Advertising Program as Top-Growing Content Provider with 63 Advertisers"; *Net 621*; Cambridge, Mass.; Apr. 15, 1996; Dialog: File 621, Acc# 00602035.

(List continued on next page.)

**Primary Examiner**—Stephen R. Tkacs  
**Attorney, Agent, or Firm**—Kenyon & Kenyon

**[57] ABSTRACT**

The present invention provides a method and apparatus for scheduling the presentation of a continuously-changing display to computer users, and is particularly well-suited for use in an advertisement-supported e-mail service. An advertisement display scheduler resident on a user's computer receives advertisements from a server system over a network. Upon receipt, the advertisement display scheduler determines the priority of the advertisement and assigns it to one of a plurality of prioritized advertisement queues. Each queue is sorted according to predetermined scheduling criteria so that advertisements deemed "more important" are presented to a user first. The advertisement display scheduler logs statistical information relating to the presentation of advertisements for use in updating the scheduling criteria, and makes such statistical information available to the server system.

**48 Claims, 8 Drawing Sheets**

## OTHER PUBLICATIONS

"Online Interactive's FreeShop Online Achieves One Million Electronic Orders—An Industry Milestone", *Business Wire*, Seattle; Feb. 7, 1996; Dialog: File 621, Acct# 00575091.

Derringer, Pam, "Freemark Delays Release of Free E-Mail Until Apr." *Mass High Tech*, Feb. 19, 1996.

Gallagher, Suzanne E., "Pressing E-Mail's Mass-Market Advantage," *DM News*, Mill Hollow Corporation, Nov. 27, 1995.

Wilder, Clinton, "Free E-Mail—For A Price," *Information Week*, Nov. 27, 1995.

"Free e-mail service launched by FreeMark," *Link Up*, Oct. 1995.

Soltes, Fiona, "Hanging 10 on the Internet not as costly as you might think," *The Tennessean*, Aug. 16, 1995.

Mohan, Suruchi, "Firm to offer free 'net mail," *Computerworld*, Jul. 10, 1995.

Ahabe, Tom, "Advertising Sponsorship is growing on the Internet," *The Middletown Press*, Jul. 1, 1995.

O'Connor, Rory, "Ads to pay for free e-mail service," *Calgary Herald*, Jun. 29, 1995.

Harler, Curt, "Distribute Coupons Via E-Mail," *RIS/Retail Info Systems News*, Jan. 1996.

Mohan, Suruchi, "Free Mail on the net forces users to trade off privacy," *Computerworld*, Nov. 27, 1995.

Corcoran, Elizabeth, "The Marketers Are On-Lining Up for You," *Washington Post*, Sep. 27, 1995.

Memon, Farhan, "Free E-Mail is here but with ads aplenty," *New York Post*, Jul. 27, 1995.

Wingfield, Nick, "Juno Offers free E-mail service to end-users," *InfoWorld*, Jul. 10, 1995.

"Their e-mail could become free mail," *The Record*, Jul. 7, 1995.

Schoenfeld, Adam et al., "Developers Plan Free E-Mail," *Online Marketplace*, Jun. 1995.

Pizzo, Stephen, "On-Line Mortgage Service Will Operate Over Internet," *National Mortgage News*, Oct. 31, 1994.

"Getting Wired With St." *Sunday Times*, Jan. 22, 1995.

"W3.COM Introduces First visitor-Tracking Software For Web Sites," *Business Wires*, Aug. 15, 1995.

"Freeloader, Inc. Announces The First Service To Deliver The Internet Offline," *PR Newswire*, Jan. 19, 1996.

"Individual Launches Newspage Direct," *PR Newswire*, Feb. 9, 1996.

Jaffee, Larry, "No Shortage of Online Choices," *DM News*, Mill Hollow Corporation, Feb. 6, 1995.

Mohan, Suruchi, "Firm to Offer Free Net Mail," *Computerworld*, Jul. 10, 1995.

O'Connor, Rory J., "Free e-mail Service Slated For The Fall; Limited Urban Areas To Try Out Advertiser-Supported Messaging Service," *Austin American-Statesman*, Jul. 1, 1995.

"Productview Interactive To Launch Free EMail Service This Year," *M2 Communications, M2 Presswire*, Jun. 28, 1995.

Corcoran, Elizabeth, "The Marketers Are On-Lining Up for You: Interactive Ads, Other Gimmicks Kick Off the Internet's New Era," *The Washington Post*, Sep. 27, 1995.

"FreeMark Communications and SportsTicker enter online sports information distribution agreement; Popular sports content first of a series of innovative content offerings to be delivered free to email users," *Business Wire*, Jan. 30, 1996.

"FreeMail, Part Two, Two Companies Announce Free Internet E-Mail Services," *Multimedia & Videodisc Monitor*, Information Access Company, Aug. 1995.

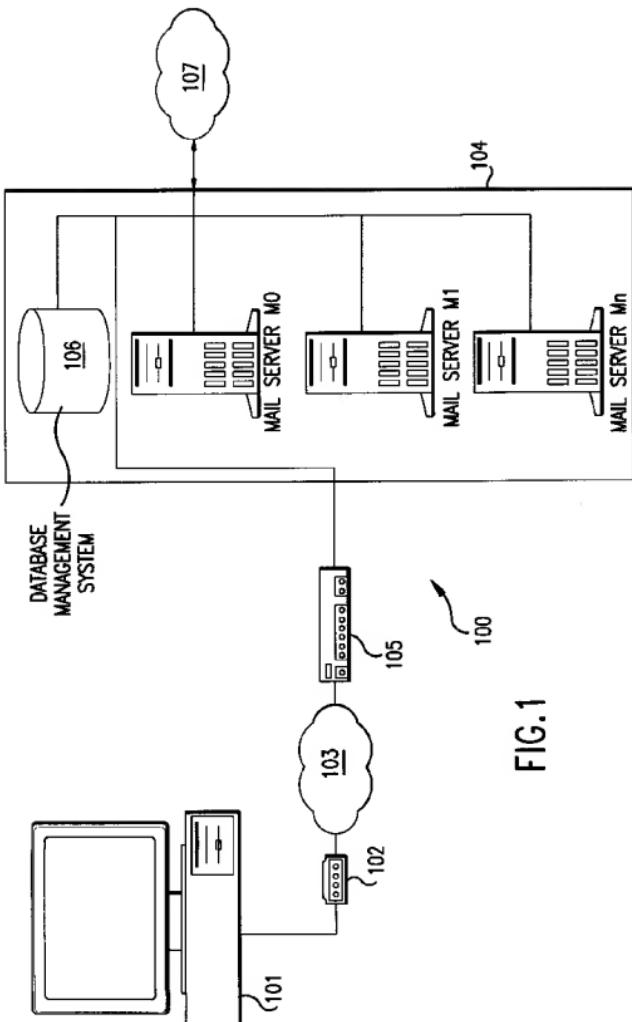


FIG. 1

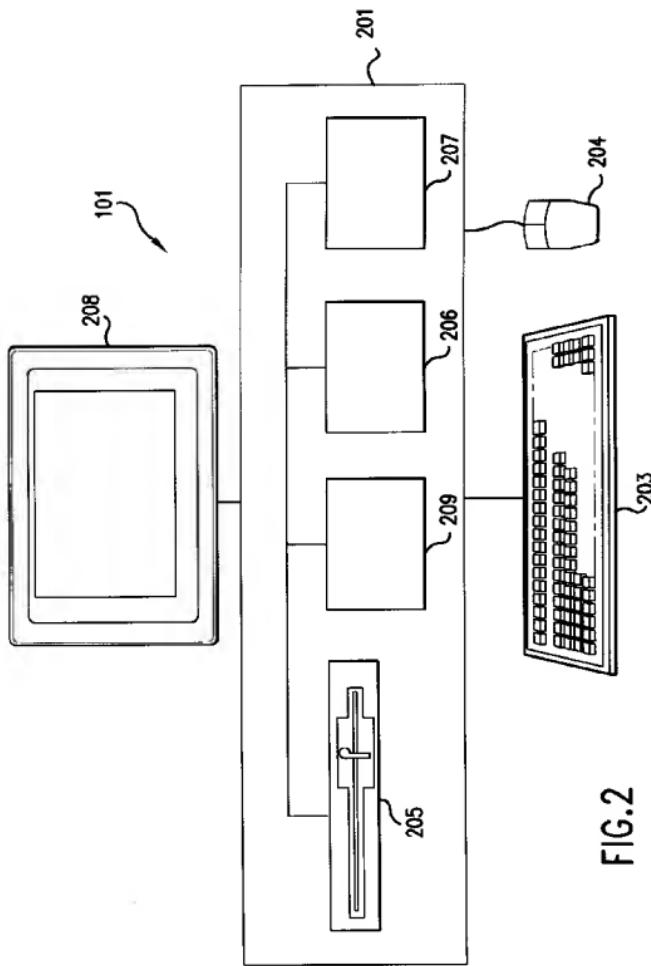


FIG. 2

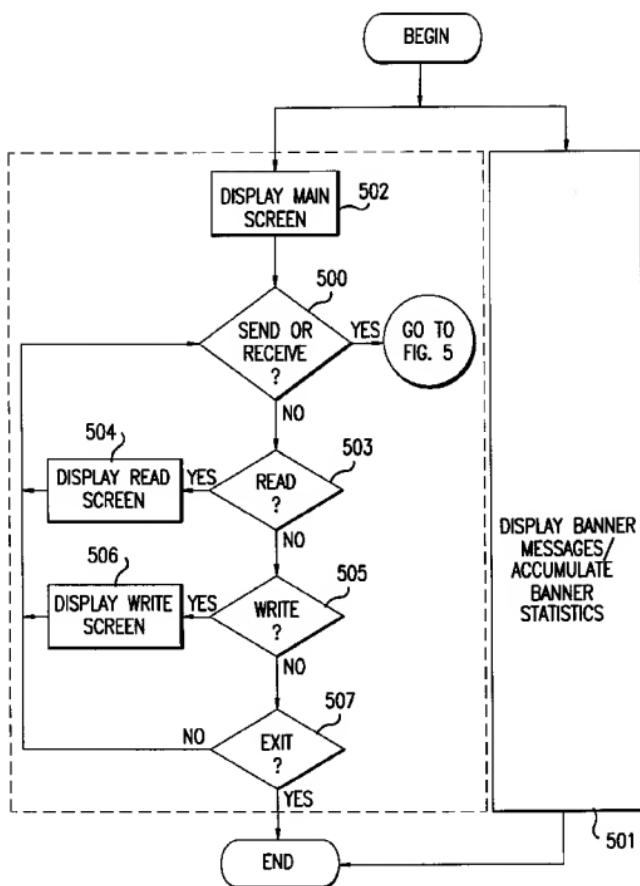
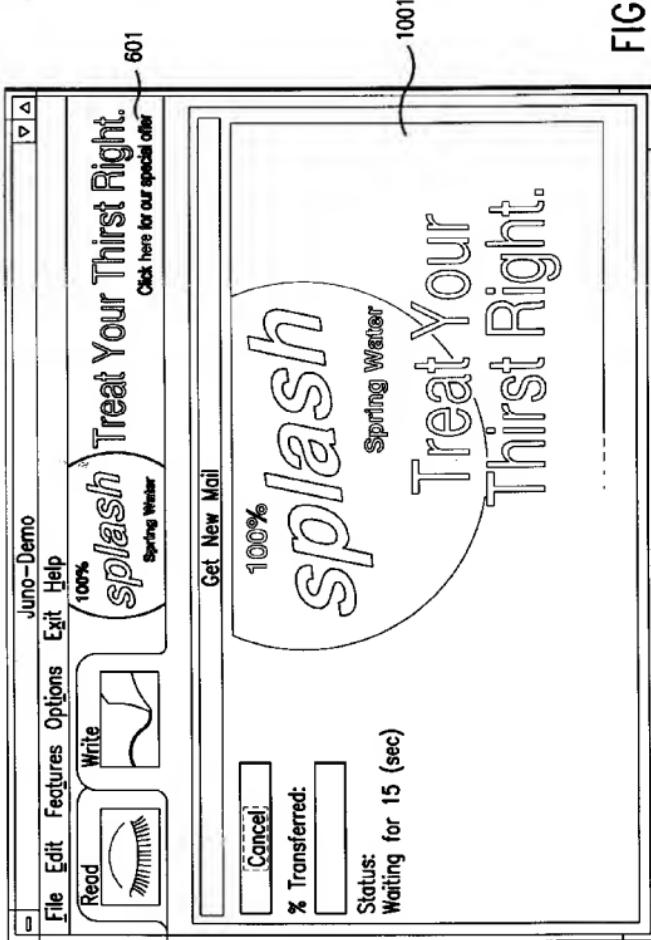


FIG.3

FIG. 4



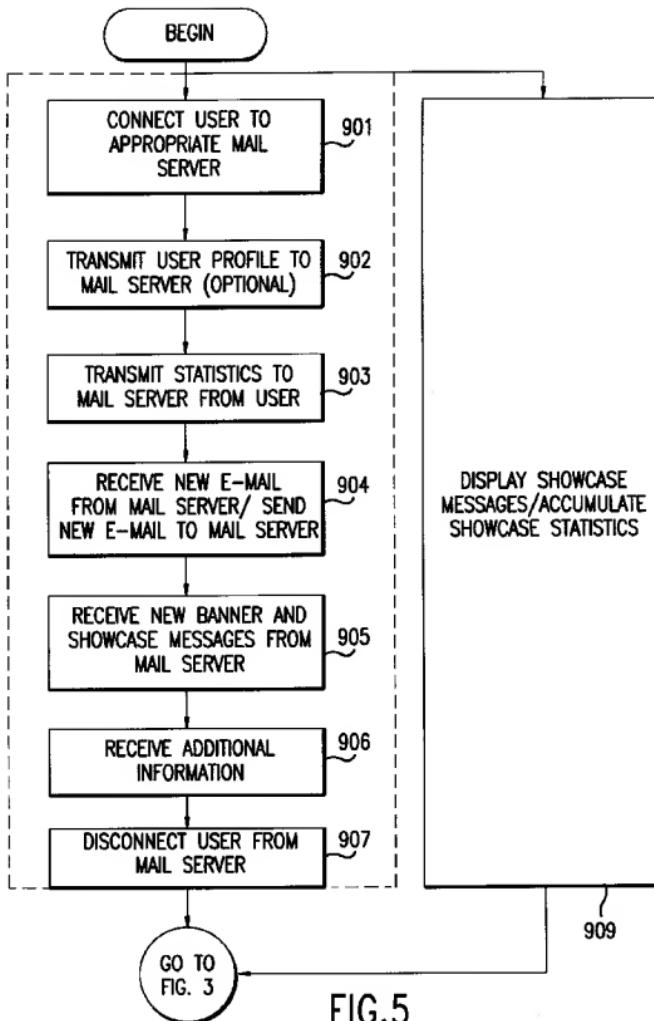


FIG.5

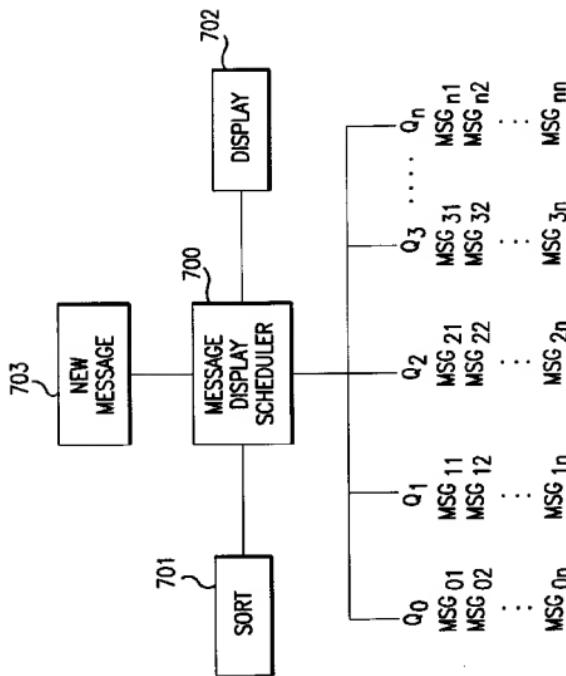


FIG. 6

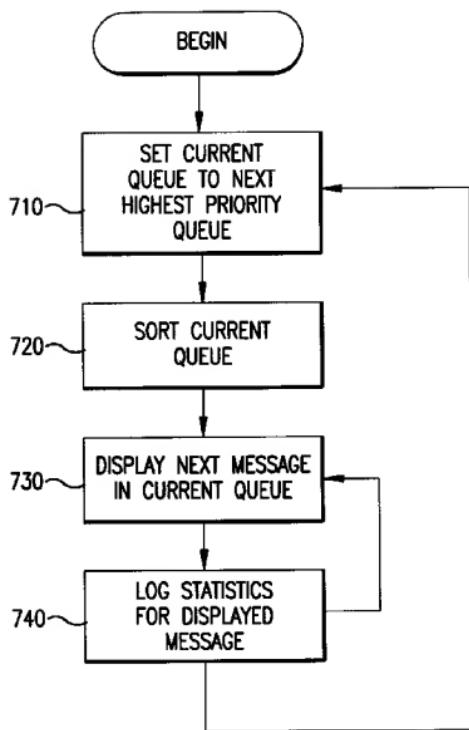


FIG.7

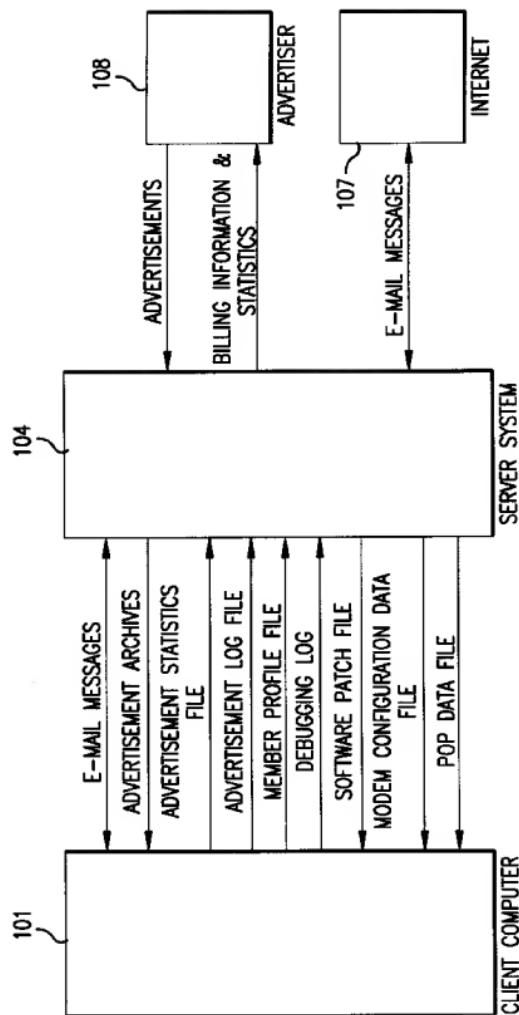


FIG. 8

**METHOD AND APPARATUS FOR  
SCHEDULING THE PRESENTATION OF  
MESSAGES TO COMPUTER USERS**

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**BACKGROUND OF THE INVENTION**

The present invention relates generally to the field of computer networking, and specifically to a system by which users of on-line computer networks may be exposed to a continuously-changing variety of advertisements. The invention is particularly well-suited for providing advertising to users of electronic mail systems while such users are not connected to an on-line network.

Electronic mail, or "e-mail," is an increasingly popular way for people to communicate. E-mail allows a person to quickly and easily send textual messages and other information (e.g., pictures, sound recordings, formatted documents) electronically to other e-mail users anywhere in the world.

An e-mail user will typically create a message using an e-mail program running on a computer connected to a computer network through a modem. The message will include an e-mail "address" for the intended recipient. When the user has finished entering the message, the user may "send" the message to the intended recipient. The e-mail program then electronically transmits the message over the computer network. The recipient, using an e-mail program running on his or her own computer, can then "receive" the message.

In recent years the Internet has become the most popular computer network used by consumers and businesses to send and receive e-mail. The Internet allows users to readily send and receive e-mail to and from computers around the world. Each user typically has a unique Internet e-mail address (e.g., bob@plo.com). A user with an e-mail account and a computer capable of connecting to the Internet can easily send and receive e-mail over the network.

Users desiring to connect to the Internet to send and receive e-mail are faced with an ever-increasing variety of service options. For example, a user can subscribe to a proprietary on-line network such as Prodigy, America Online, CompuServe or Microsoft Network. Using a standard personal computer equipped with a modem, the user dials an access number to connect to proprietary on-line network. The user can then send and receive e-mail to and from other users of that proprietary network and, provided that the network is connected to the Internet, with any other user having an Internet e-mail address.

An alternative method for accessing the Internet is through an Internet Service Provider. Again using a modem, the user dials the access number of an Internet Service Provider to establish a connection with a computer "directly" connected to, or part of, the Internet. The user can then use an e-mail program, such as *Ludora*, to send and receive e-mail over the Internet.

The foregoing are merely examples of the ways that users can establish a connection with on-line networks to send and receive e-mail. Many other access methods exist today, and others will continue to become available as use of the

Internet becomes more and more common. The present invention is not dependent upon any particular access method.

A major disadvantage of existing e-mail systems, at least from the standpoint of the user, is that the user must pay for the e-mail service. For example, proprietary on-line networks and Internet Service Providers charge users in a number of ways, including monthly access fees, hourly connect fees, fees charged on a per-message basis, and fees based on the number of characters sent by e-mail. Providing reliable e-mail service is costly in view of hardware, software and communication requirements.

A system for providing e-mail service to users is disclosed in co-pending U.S. patent application Ser. No. 08/948,579 entitled "Electronic Mail System with Advertising" in the name of David E. Shaw, Charles E. Ardia, Brian D. Marsh, Mark A. Moraes, Dana B. Rudolph and Jon D. McAuliffe, filed concurrently herewith. In that system, the cost of providing e-mail service need not be recovered from individual users, but rather, can be recovered from advertisers. The specification of that application is expressly incorporated herein by reference in its entirety.

Apart from the Applicants' innovative e-mail system, some on-line service providers also display advertising to their users. For example, the America Online network displays advertisements to users on a portion of their computer screen. Likewise, advertisements are often included as part of web pages seen by users when accessing certain World Wide Web sites on the Internet. Often in such systems, every user accessing a certain screen or site is shown the same advertisement. More sophisticated systems have the capability to change an advertisement after a certain period of time. Nevertheless, such systems generally require that the user be connected to the on-line network to view the advertisements.

With many existing on-line networks, users must be connected to the on-line network to read and write e-mail messages. This is undesirable for several reasons. From the service provider's view, operating costs (including communication and hardware costs) are necessarily higher when users are connected to network. From the user's view, many on-line service providers charge fees based on connect time. Accordingly, it is more cost-effective if e-mail users read and write their messages when off-line (i.e., when not connected to the on-line network), and only connect to the on-line network to actually send and receive e-mail messages (i.e., uploading messages to the network and downloading messages from the network).

Encouraging e-mail users to minimize on-line access is problematic for on-line service providers and their advertisers because existing systems do not permit advertisements to be displayed and/or updated when the user is off-line. Thus, even if an advertisement was downloaded to a user during a period of on-line access, the advertisement could become "stale." Advertisers would run the risk of users being numbed or otherwise negatively affected by their advertising as a result of overexposure. Accordingly, there is a need for a system whereby users of on-line networks can be exposed to a dynamic display of advertisements while the user is not connected to the on-line network.

Accordingly, there is a need for a system that schedules the distribution, downloading and display of advertisements to users of remote computers that maximizes advertiser revenues but minimizes system costs.

**SUMMARY OF THE INVENTION**

The present invention provides a method and apparatus for scheduling the distribution, downloading and presenta-

tion of a continuously-changing display to computer users. The invention is particularly well-suited to presenting advertisements to users of an electronic mail service, thereby eliminating the need to charge the users for the service.

In a representative embodiment of the present invention, an advertisement display scheduler resides on a user's computer (i.e., a client system) and manages the presentation of advertisements to the user. The advertisement display scheduler receives advertisements from a server system which communicates with the client system over a computer network.

The server system includes an advertisement distribution scheduler which determines the advertisements that are eligible for distribution to each user. The advertisement distribution scheduler may be used to target advertisements to particular users based on demographic information stored in a database management system resident on the server system. Demographic information may be obtained, for example, by having a user complete a survey, or member profile, when first accessing the client system (and upon later updates by the user). The member profile may include such information as the user's hobbies, interests, employment, education, sports, age and gender. The member profile would be transmitted for storage in the database management system the first time the user establishes a connection to the server system. This feature is particularly useful for targeted advertising.

The server system also includes an advertisement download scheduler which determines when the advertisements are transferred to each user. The advertisement download scheduler may ensure, for example, that high-priority advertisements are transmitted to a user before low-priority advertisements. Likewise, the advertisement download scheduler manages the number of advertisements that are transmitted at any given time, so that the user is not forced to wait unnecessarily for a long transmission of advertisements when there is no other need to be on-line.

Significantly, the advertisements to be shown to system users are not in any way correlated with a user's e-mail. Thus, the advertisements can be regarded as context independent. The e-mail messages come from a different source than that of the advertisements (e.g., e-mail messages originate from other network users, while the advertisements may originate from advertisers). There need not be any correlation between the number of e-mail messages sent and/or received and the number of advertisements transferred to or stored at the client computer. Indeed, in a representative embodiment, the advertisements are stored at the client computer in a different subdirectory from the e-mail messages, and are not linked to any particular e-mail message or messages. Control of the display of e-mail messages is likewise independent from the control of the presentation of advertisements; that is, the client program determines which advertisements to present and when, whereas the user determines which e-mail messages to read/write and when.

Upon receipt of an advertisement from the server system, the advertisement display scheduler determines the priority of the advertisement and assigns it to one of a plurality of prioritize advertisement queues (e.g., HIGH\_PRIORITY, MEDIUM\_PRIORITY, LOW\_PRIORITY, NO\_PRIORITY). Each of these priority queues are sorted according to predetermined scheduling criteria so that advertisements deemed to be "more important" are presented to a user first.

In one embodiment, the scheduling criteria for the advertisements include the time to expiration, time since last seen,

maximum exposures to a user, and percentage of exposures remaining. The scheduling criteria are selected with the goal of maximizing the revenue to the e-mail service provider, subject to a "no starvation" constraint, in view of the particular billing arrangements with the vendors associated with the advertisements.

The advertisement display scheduler computes a partial ordering (i.e., which should come first) between all pairs of advertisements in the advertisement queues. Such an ordering is sufficient to determine a total ordering on the entire set of advertisements. To determine which of two advertisements should be presented first, the advertisement display scheduler computes a difference, or "delta," between the two advertisements with respect to a predetermined set of weighted scheduling criteria. The algebraic sign of the sum of these differences indicates which of the advertisements should be shown first.

The advertisement display scheduler of the present invention is capable of presenting a number of different types of advertisements to users according to the present status of the client system. For example, when the user is reading or writing e-mail messages, the advertisement display scheduler continuously presents a series of "banner advertisements" which appear above the workspace on the user's video monitor. When a connection to the server system is being established or during the retrieval of e-mail messages from the server system, the advertisement display scheduler additionally presents a series of "showcase advertisements" which occupy most or all of the workspace.

The advertisement display scheduler includes the ability to log statistics relating to the presentation of advertisements to users. For example, the advertisement display scheduler can track the number of times a given advertisement has been presented, and the period of time between presentations and user interaction with an advertisement (e.g., "clicking" on the advertisement to receive additional information). Such information is used by the advertisement display scheduler itself to update the scheduling criteria for the various advertisements, and is reported back to the server system for use in billing vendors.

Various features and advantages of the present invention are described below with reference to the drawings. Other features and advantages will be readily apparent to those skilled in the art.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of an exemplary e-mail system of a type to which an advertisement display scheduler is configured according to the present invention may be applied.

FIG. 2 is a block diagram of exemplary client system hardware which may be used in conjunction with the exemplary e-mail system.

FIG. 3 is a flowchart describing the basic processing of the client system software for the exemplary e-mail system.

FIG. 4 illustrates a preferred placement of advertisements presented by the advertisement display scheduler of the present invention.

FIG. 5 is a flowchart describing the process by which e-mail is retrieved by the client system of the exemplary e-mail system.

FIG. 6 is a block diagram showing an embodiment of an advertisement display scheduler according to the present invention.

FIG. 7 is a flowchart describing the high-level processing of an embodiment of the advertisement display scheduler of the present invention.

FIG. 8 describes the information that may be communicated between a client system and a server system according to an embodiment of the present invention.

#### DETAILED DESCRIPTION

The present invention is a scheduler system for use in controlling the selection, downloading and presentation of advertisements to users of a computer system. The invention is described in the context of an e-mail system having both client and server components. An advertisement display scheduler of the present invention is a client-based application, receives advertisements periodically from the server component, and determines when advertisements should be output. The server component includes an advertisement distribution scheduler, which determines the advertisements eligible for distribution to a user, and an advertisement download scheduler, which determines how and when advertisements are downloaded to the client system. The various components of these schedulers are described below, along with the underlying e-mail system in which these schedulers are incorporated.

Although the terms "client" and "server" are used herein to describe representative embodiments, the present invention is in no way limited to the architecture known in the art as a "client/server network."

#### The E-Mail System

Referring to FIG. 1, an exemplary e-mail system 100 of the type to which the present invention may be applied includes a client system 101 and a server system 104 which communicate with one another over a network 103. The client system 101 may be a workstation, personal computer or any other processor-based system capable of supporting at least one system user.

The client system 101 is connected to a communication interface 102 for allowing the client system 101 to communicate with other computer systems. As illustrated, the communications interface 102 is external to the client system 101, but an internal communications interface 102 is equally acceptable. Also, while the communications interface 102 of FIG. 1 is a modem intended to provide communication connectivity to remote systems via a network 103, such as a privately switched telephone network (PSTN), the communications interface 102 could alternatively be a network interface unit, a network card or some other comparable device providing connectivity to other computer systems over a network using such protocols as X.25, Ethernet, or TCP/IP.

Using the communications interface 102, the client system 101 selectively communicates with the server system 104 over the network 103 through a communications server 105. In the disclosed configuration, the communications server 105 couples the client system 101 to one of a plurality of mail servers M<sub>0</sub> . . . M<sub>n</sub> that form the server system 104.

Referring now to FIG. 2, a base unit of the client system 101 includes a central processing unit 209 for executing computer programs and controlling the operation of the client system 101. The base unit also includes a removable storage device drive 205, such as a floppy disk drive, in communication with the central processing unit 209 for reading and writing data and computer programs. A permanent storage device 206 is likewise communicatively connected to the central processing unit 209, and also provides a means for storing computer programs and data. Storage device 206 is ideally a hard disk having a storage capacity of at least twenty (20) megabytes. A dynamic memory

device 207 is in communication with the central processing unit 209 for providing temporary storage of computer programs and data.

The client system 101 also has a user interface including a display terminal monitor 208 for displaying graphical and textual information to a user, and input devices such as a keyboard 203 and a mouse 204 permitting the user to communicate with the base unit.

As illustrated in FIG. 6 and explained more fully below, the client system 101 also includes an advertisement display scheduler 700. The advertisement display scheduler 700 can be implemented as a separately-executable software module included in the client system software, and is maintained in the storage device 206 of the client system 101.

Referring again to FIG. 1, the server system 104 communicating with the client system 101 is an electronic mail (e-mail) system which functions as an electronic post office. The server system 104 may receive and deliver e-mail messages addressed to users connected directly or indirectly to it, as well as to non-users through a network 107, such as the Internet. The server system 104 also delivers advertisements for subsequent presentation to the user when the user is not in communication with the server system 104 and/or when information is being transformed between the client system 101 and the server system 104. The server system 104 also includes a plurality of signup servers S<sub>0</sub> . . . S<sub>n</sub> that are used when the user first establishes an account with the server system 104.

As explained in more detail below, in the representative embodiment, the advertisements may be presented to the user as either "banner advertisements" or "showcase advertisements." The presentation of the advertisements is controlled by the advertisement display scheduler 700 configured according to the present invention.

The server system 104 includes a database management system 106 in communication with each of the plurality of mail servers M<sub>0</sub> . . . M<sub>n</sub>. The database management system 106 stores various information related to advertisements (e.g., vendor identification, billing information, target demographics), and information regarding system users. The database management system 106 may have a hardware configuration similar to the mail servers M<sub>0</sub> . . . M<sub>n</sub>, but ideally includes a plurality of high-capacity storage devices. Alternatively, the database management system 106 may be a distributed system comprising a plurality of file servers, each operating on a hardware configuration similar to that of the mail servers M<sub>0</sub> . . . M<sub>n</sub>.

Referring again to FIG. 2, in order to operate the client system 101, a user must first load the client system software onto the client system 101 using, for example, an installation program stored on a floppy disk that is readable by the removable storage device driver 205. Once installed, the user can initiate local execution of the client system software.

The client system software may execute in a GUI environment, such as that provided by Microsoft Windows. In the GUI environment, the user may use the mouse 204 to "click" on an icon representing the client system software, thereby initiating execution.

#### Presentation of Advertisements

According to an embodiment of the present invention, two types of advertisements are presented to users of the client system 101: banner advertisements and showcase advertisements. The primary vehicle for presenting information, such as advertisements, to users during periods

of on-line activity is the banner advertisement. Showcase advertisements are typically used to present information to users while a connection is being established with the server system 104 and while information (including e-mail messages and advertisements) are being transferred between the client computer 101 and the server system 104.

The flowchart of FIG. 3 illustrates the basic processing of the client system 101 following completion of installation and initial user setup procedures (e.g., automatic configuration of the user's modem to communicate properly with the server system 104, activation of a new user account, completion of a user profile to provide demographic information for targeted advertising). The client system 101 continuously displays banner advertisements on a predetermined portion of the display terminal monitor 208 concurrently with the operation of the client system (step 501), and records statistical information relating to the display (e.g., what advertisements were shown and for how long). For example, the banner advertisements are displayed whenever the user is using the client system to read or write e-mail messages. As shown in FIG. 3, which is a flowchart describing the basic processing of the client system software for the exemplary e-mail system, when the process begins, banner messages may be displayed and banner statistics may be accumulated (step 501). The process may also concurrently display a main screen (step 502) and determine if e-mail is to be sent or received (step 503). If e-mail is to be sent or received, the process described in detail with respect to FIG. 5 is performed. If e-mail is not to be sent or received, the process may determine if e-mail is to be read (step 503). If e-mail is to be read, the read screen is displayed (step 504) and the process continues at step 500. If e-mail is not to be read, the process may determine if e-mail is to be written (step 505). If e-mail is to be written, the write screen is displayed (step 506) and the process continues at step 500. If e-mail is not to be written, the process may determine whether to exit (step 507). If the process determines to not exit, the process continues at step 500. If the process determines to exit, the process ends.

FIG. 4 provides an example of a display terminal monitor 208 showing a banner advertisement 601. The banner advertisement 601 is positioned prominently, but relatively unobtrusively, in the upper right-hand portion of the video display. The banner advertisement 601 can be replaced or updated by another one of a plurality of stored advertisements after a predetermined period of time has elapsed. Replacing the display (or other output) of an advertisement with the display (or other output) of another advertisement can take place while the client computer 101 is not connected to the server system 104. The advertisements that are retrieved from memory of the client computer 101 prior to output.

The banner advertisement 601 may be interactive. For example, by clicking on a specified portion of the banner advertisement 601, the user may be provided with additional information concerning the subject matter of the banner advertisement 601. Likewise, the user may access an e-mail message template including the e-mail address of a vendor associated with the banner advertisement 601 being displayed, so that the user may easily forward comments or requests for additional information. Clicking on the banner advertisement 601 may also cause an e-mail message to be automatically completed (including the message text) and either transmitted immediately to the vendor or stored in an "outbox" for later transmission.

Showcase advertisements 1001 can be displayed in addition to the previously-described banner advertisements 601

during periods of on-line activity; for example, during the entire time that the client system 101 is establishing communications and actually communicating with the server system 104. The flowchart of FIG. 5 illustrates one such period when showcase advertisements are displayed, that is, during performance of a "Get New Mail" function of the client system 101. As shown in FIG. 5, which is a flowchart describing the process by which e-mail is retrieved by the client system of the exemplary e-mail system, when the process begins, showcase messages may be displayed and showcase statistics may be accumulated (step 909). The process may also concurrently connect a user to an appropriate mail server (step 901). The process may then optionally transmit a user profile to the mail server (step 902) and transmit statistics to the mail server from the user (step 903). The process may also receive new e-mail from the mail server and send new e-mail to the mail server (step 904). In addition, the process may receive new banner and showcase messages from the mail server (step 905) and receive additional information (step 906). Finally, the process may disconnect the user from the mail server (step 907), and the process described in detail with respect to FIG. 3 may be performed.

Referring again to the video display mock-up of FIG. 4, a showcase advertisement 1001 is a relatively large advertisement that can occupy the entire primary operational portion of the video display. Like the banner advertisement 601, the showcase advertisement 1001 can be replaced after a predetermined period of time with a different showcase advertisement.

#### Schedulers

According to the representative embodiment of the present invention, the client system 101 includes an advertisement display scheduler that controls the display of both the banner advertisements 601 and the showcase advertisements 1001. Referring to FIG. 6, the advertisement display scheduler 700 can be configured as a software module included in the client system software and includes a new advertisement routine 703, a sort routine 701 and a display routine 702. The advertisement display scheduler 700 likewise maintains a plurality of advertisement queues  $Q_1, \dots, Q_n$ , each of which contains a plurality of advertisements (e.g.,  $MSG_{1,1}, \dots, MSG_{1,n}$ ). The advertisement queues  $Q_1, \dots, Q_n$  can be maintained in the storage device 206.

The advertisement display scheduler 700 receives digital representations of banner advertisements and showcase advertisements from the server system 104. Each advertisement transmitted to the client system 101 includes control information, such as the expiration date for the advertisement and the maximum number of times the advertisement may be shown to a user, along with a priority assigned by the server system (e.g., HIGH, MEDIUM, LOW, NO). Upon receipt of a given advertisement, the advertisement display scheduler 700 assigns the advertisement to one of the plurality of advertisement queues  $Q_1, \dots, Q_n$  according to its previously-assigned priority. The advertisement queues  $Q_1, \dots, Q_n$  reside in a designated portion of the storage device 206 having a predetermined memory capacity (e.g., 10 MB) which is specifically reserved for storage of advertisements at the time the client system software is installed.

The flowchart of FIG. 7 illustrates the basic processing used by the advertisement display scheduler 700 to determine the order in which advertisements, and particularly banner advertisements, are shown to a system user. The advertisement display scheduler 700 first designates the

highest priority advertisement queue (e.g.,  $Q_0$ ) as the current advertisement queue (step 710). The sort routine 701 of the advertisement display scheduler 700 then sorts the advertisements in the current queue according to predetermined characteristics of the advertisements, as is more fully described below (step 720).

Once the current advertisement queue is fully sorted, the display routine 702 of the advertisement display scheduler 700 steps through the queue, sequentially presenting each advertisement for a predetermined period of time until all of the advertisements in the current advertisement queue have been shown (step 730), logging statistics with respect to each advertisement actually shown (step 740). The method of displaying information on a video monitor is well-known in the art, and thus is not described herein. When the current advertisement queue has been exhausted, the advertisement display scheduler 700 designates the next-highest priority queue (e.g.,  $Q_1$ ) as the current queue and repeats the processing.

In general, the advertisement display scheduler 700 continuously loops through the basic processing illustrated in FIG. 7 as long as the client system 101 is running. When the advertisement display scheduler 700 has completed presenting all of the advertisement in its lowest-priority queue (e.g.,  $Q_n$ ), the queue processing simply returns to the beginning and again designates the highest-priority queue as the current advertisement queue.

In a representative embodiment, the advertisement display scheduler 700 monitors the client system 101 for extended periods of inactivity (i.e., the time between key strokes) and "times out" if there is no activity within a predetermined period of time (e.g., five minutes). This is a highly-desirable feature from the standpoint of advertisers, who understandably do not want to be billed for advertisements that are presented on an unattended video display monitor. Conversely, this feature provides advertisers with a relatively high degree of assurance that a user has actually viewed the images presented by the advertisement display scheduler 700.

As noted above, the advertisement display scheduler 700 of the present invention sorts the current advertisement queue according to certain predetermined characteristics of the advertisements contained therein. In the representative embodiment, these characteristics are time to expiration (tte), time since last seen (tsls), maximum exposures (me) and percent remaining exposures (pre); however, other characteristics could similarly be used depending on the requirements of any particular application.

A goal of the sorting process is to maximize the revenue that may be generated from each advertisement given the particular billing arrangements with the associated vendors, subject to a "no starvation" constraint. "Starvation" in this context refers, for example, to an advertisement reaching its expiration date without having reached its maximum number of exposures. (It will be appreciated that there is a cost in transferring advertisements from the server system 104 to client computers 101.) A less lucrative advertisement may be favored over a more lucrative advertisement if that less lucrative advertisement is nearing expiration. Yet another constraint on the sorting process may be that an advertisement nearer to reaching its maximum exposures is favored to make room in the advertisement queues for potentially more-lucrative advertisements.

The advertisement display scheduler 700 may also advantageously facilitate separation of particular advertisements. For example, a given advertisement may have associated

with it one or more other advertisements with which it is mutually exclusive (e.g., advertisements relating to competing products of another vendor). In such a case, the advertisement display scheduler 700 may determine the appropriate order for a given advertisement queue and then make a pass through the sorted advertisement queue to eliminate conflicting advertisements. A list of excluded advertisements may be included as part of the scheduling criteria associated with each advertisement. Advertisement separation performed by the advertisement display scheduler 700 may also include a time component. For example, once a first advertisement is output, a second advertisement for a competing product will not be output for a period of time, e.g., seven days. In the representative embodiment, the period of time for separation is one pass through the advertisement queue. Thus, the period of separation can be determined dynamically based upon the length of time that the user utilizes the system. The process of excluding advertisements from a given queue based upon other advertisements can take place either before or after the sort routine 701.

The sort routine 701 of the advertisement display scheduler determines the order in which the advertisements in the current advertisement queue are presented to a user. The sort routine 701 may employ any suitable technique, such as a quick insert or a bubble sort. Such techniques are well known in the art, and thus are not described in detail herein. Moreover, the present invention does not depend on the use of any particular sorting technique.

Conceptually, the sort routine 701 views the set of possible values for each of the four scheduling criteria (i.e., tsls, tte, me, pre) as defining a four-dimensional space. Each scheduling criterion is associated with a corresponding weighting constant as follows:

35  $c_1=TT\acute{E} \text{ WEIGHT}$   
 $c_2=TSLS\_WEIGHT$   
 $c_3=TE \text{ WEIGHT}$   
 $c_4=PRE\_WEIGHT$

40 These constants, which are assigned predetermined values as described below, may then be used to construct a separating hyperplane through the origin defined by the following hyperplane equation:

$$45 (c_1x_1)+(c_2x_2)+(c_3x_3)+(c_4x_4)=0,$$

where:

$x_1=tte$   
 $x_2=tsls$   
 $x_3=me$   
 $x_4=pre$

The separating hyperplane divides the four-dimensional space into two halves: one half when the first of the two advertisements being sorted should be presented first, and one half when the second of the two advertisements should be presented first. In the representative embodiment, a negative result for the hyperplane equation is arbitrarily defined to mean that the first advertisement should be shown before the second advertisement, and a positive result means the second should be shown before the first. By substituting the delta values computed for  $x_1$  through  $x_4$  (using the values for each advertisement as maintained by the advertisement display scheduler 700) and the predetermined values for  $c_1$  through  $c_4$  into the hyperplane equation, it is possible to determine where the total difference between the two advertisements lies with respect to the hyperplane, thus deciding

the order in which the advertisements should be presented by the advertisement display scheduler 700.

The values of the four weighting constants ( $c_1, \dots, c_4$ ) orient the separating hyperplane in the four-dimensional space, thus completely determining the behavior of the hyperplane equation and, in turn, the sorting of the current advertisement queue. The signs of the weighting constants play an important role in determining the order in which advertisements are presented. In the representative embodiment, the signs of the weighting constants are as follows:

Vector	Sign	Rationale
TITLE_WEIGHT	-	If the first advertisement arrives sooner than the second, the delta is negative (i.e., favors the first advertisement). Since it is desirable to complete the maximum exposures before expiration of an advertisement, the sign is not changed.
TSLS_WEIGHT	-	If the first advertisement was seen more recently, the delta is negative (i.e., favors the first advertisement). Since it is desirable to present the advertisement which has not been seen recently, the sign of the delta is changed to favor the second advertisement.
ME_WEIGHT	-	If the first advertisement has fewer total exposures, the delta is negative (i.e., favors the first advertisement). Since completing all $c_3$ , the exposures of the first advertisement is set to do because its minimum is lower, presenting the first advertisement will make progress towards more of that advertisement out of the queue. The sign of the delta has not changed.
PRF_WEIGHT	-	If the first advertisement has remaining exposures in percentage terms, the delta is negative (i.e., favors the first advertisement). Since this means the first advertisement has been shown more often in percentage terms, it is desirable to favor the second advertisement to combat "starvation." The sign of the delta is therefore changed.

The sort routine 701 sequentially processes pairs of advertisements in the current advertisement queue. For each pair, the sort routine 701 calculates the delta between the two advertisements for the various scheduling criteria. The deltas are then used to solve the hyperplane equation, with the sign of the result determining whether the order of the advertisements should be switched. The sort will continue until a complete pass is made through the current advertisement queue without having to switch the position of any advertisements.

The following example will illustrate the operation of the sorting routine 701 of the advertisement display scheduler 700. Assume the current advertisement queue contains three advertisements ordered as below and having the following characteristics:

Advertisement	ts	tsd	me	pre
MSG <sub>1</sub>	5 days	1 hour	100	45
MSG <sub>2</sub>	10 days	5 hours	20	93
MSG <sub>3</sub>	1 day	24 hours	20	53

Further assume that the weighting constants have been predefined to have the following values:

TITLE_WEIGHT ( $c_1$ )	8
TSLS_WEIGHT ( $c_2$ )	-1
ME_WEIGHT ( $c_3$ )	2
PRF_WEIGHT ( $c_4$ )	-4

On the first pass of the sorting routine 701, MSG<sub>1</sub> and MSG<sub>2</sub> are compared to determine which should be presented first. Applying the above values for the scheduling criteria, the deltas are calculated as:

$\delta_1$	$(5-10) = -5$
$\delta_2$	$(1-5) = -4$
$\delta_3$	$(100-10) = 90$
$\delta_4$	$(40-97) = -57$

Inserting these deltas and the weighting constants in the hyperplane equation then yields the following:

$$20 \quad \text{pos} = (3-5) * 8j - (1-4) * (-1j) + (93 * 2) + (100 * (-4)) \\ = -2j + (4) + (180) + (200) \\ = 344$$

25 This positive result indicates that MSG<sub>2</sub> should be presented first, so the order of MSG<sub>1</sub> and MSG<sub>2</sub> will be reversed in the current advertisement queue. This reordering is consistent with the rationales expressed above for the signing of the weighting constants, since three of the four criteria favored presenting the second advertisement (here, MSG<sub>2</sub>) before the first (here, MSG<sub>1</sub>).

30 After switching the positions of MSG<sub>1</sub> and MSG<sub>2</sub>, MSG<sub>2</sub> will be compared to MSG<sub>3</sub> to determine which should be presented first. Applying the same approach, the hyperplane equation yields the following result:

$$35 \quad \text{pos} = (4-8) + ((-25) * (-1j)) + (83 * 2) + ((-10) * (-4)) \\ = -3j + (25) - (10j) + (40) \\ = 255$$

40 Once again, the positive result indicates the second advertisement (here, MSG<sub>2</sub>) should be presented before the first advertisement (here, MSG<sub>3</sub>). The position of the two advertisements will therefore be swapped in the current advertisement queue.

45 Thus, after the first pass of the sorting routine 701, the current advertisement queue appears as follows:

Advertisement	ts	tsd	me	pre
MSG <sub>2</sub>	10 days	5 hours	100	93
MSG <sub>3</sub>	day	24 hours	20	53
MSG <sub>1</sub>	5 days	1 hour	100	45

50 The sort routine 701 will continue making passes through the current advertisement queue until a complete pass is made where it is not necessary to swap any two advertisements. Thus, at the completion of the sort routine's processing, the advertisements in the current advertisement queue will appear in the optimal order in which they should be presented to a user. Once again, it should be noted that the foregoing is offered merely by way of example; the present invention does not rely on any particular sorting technique.

55 As the foregoing example demonstrates, the values assigned to the weighting constants (i.e.,  $c_1-c_4$ ) significantly impact the ultimate ordering of the advertisements. It has

been found to be advantageous to designate one of the weighting constants (e.g.,  $c_3$ ) as a numerator and set its value to "1". The other weighting constants may then be assigned exponentially increasing values based on their perceived importance. In this way, the most important scheduling criteria will have a proportionately greater impact on the ultimate ordering of the advertisements.

The particular values used in the representative embodiment were chosen to increase the probability of completing the maximum exposures for a given advertisement prior to the time the advertisement expires, thereby maximizing the revenue earned from the vendor who commissioned the advertisement. In effect, the advertisement display scheduler functions like a shortest-time-to-completion/first-scheduled operating system. Persons skilled in the art will recognize, however, that other values may be equally or better suited for a given application in view of the particular characteristics of the advertisements, vendor requirements and billing considerations.

In the representative embodiment, the advertisement display scheduler 700 will continue to schedule a given advertisement until the advertisement is "expired" (i.e., its expiration date is passed) or is "exhausted" (i.e., its maximum exposures for the user are reached). In either case, the advertisement display scheduler 700 will remove the advertisement from its advertisement queue.

As noted above, the advertisement display scheduler 700 of the present invention may maintain a plurality of prioritized advertisement queues, including HIGH, MEDIUM, LOW and NO priority queues. In the event that none of the so-called "normal" priority queues (i.e., HIGH, MEDIUM and LOW) contain an advertisement, either because no advertisements have been received from the server system 104 or because all of the advertisements have expired or exhausted, the advertisement display scheduler 700 will sort and present advertisements from the NO\_PRIORITY queue until a normal priority advertisement is received. The NO\_PRIORITY queue can contain things like public service advertisements and the corporate logo of the e-mail service provider.

Once a normal priority advertisement is received by the advertisement display scheduler 700, that advertisement will generally be scheduled next and the NO\_PRIORITY queue will not be returned to until the normal priority advertisement becomes expired or exhausted. Nevertheless, to avoid showing the same advertisement in succession when there is only one normal priority advertisement in the queues, the advertisement display scheduler 700 may draw an advertisement from the NO\_PRIORITY queue between two showings of the same single normal priority advertisement. In the event there are no advertisements remaining in any of the advertisement queues, including the NO\_PRIORITY queue, the advertisement display scheduler may display a white background or some default advertisement.

#### Receiving Advertisements

In general, the advertisement display scheduler 700 of the present invention receives all of the advertisements it will show from the server system 104. For example, the server system 104 may transmit new banner advertisements and/or showcase advertisements to the client system 101 when a user goes on-line to retrieve e-mail messages as illustrated in FIG. 5. An initial set of advertisements may also be loaded along with the client system software to ensure that the user is shown advertisements even before the user goes on-line for the first time.

Advertisements may be transmitted according to any known data transfer technique and in any format, e.g., as bit

map images. New advertisements are written to the storage device 206 and are processed by the new advertisement routine 703 of the advertisement display scheduler 700. In addition to display information, a new advertisement will include scheduling information such as its priority (e.g., HIGH, MEDIUM, LOW, NO), the maximum number of times the advertisement should be presented, and its expiration date. In the representative embodiment, advertisements are transferred to and stored at the client computer 101 in the form of advertisement archives. Each advertisement archive comprises information used to output an advertisement (e.g., bitmap information, position information, MP3L information, MIDI information, etc.) and advertisement control information. The advertisement control information for each advertisement includes information such as its priority (e.g., HIGH, MEDIUM, LOW, NO), the maximum number of times the advertisement should be presented, and its expiration date, and other parameters that can be used to control the scheduling of the output of advertisements. Each advertisement archive can also include an identification number or code for the advertisement.

FIG. 8 illustrates the information that may be communicated between the client system 101 and the server system 104 in an embodiment of the present invention. The server system 104 may receive advertisements from an advertiser 108.

When a normal priority advertisement is received during processing of a normal priority queue, the advertisement display scheduler 700 will determine whether the new advertisement belongs in the current advertisement queue (i.e., if its priority matches the queue's priority). If so, the new advertisement routine 703 determines where in the current advertisement queue the new advertisement belongs. Starting with the advertisement immediately following the current advertisement, the new advertisement is sequentially compared with each advertisement in the current advertisement queue until one is found which the new advertisement should come before. The new advertisement routine 703 may invoke the sort routine 701 to accomplish this comparison using the above-described hyperplane equation, as described above. The new advertisement is then inserted into the current advertisement queue immediately before that advertisement. In effect, one round of the insertion sort is conducted to ensure that the portion of the current advertisement queue following the current advertisement remains sorted even after insertion of a new advertisement.

If a newly-received advertisement does not belong in the current advertisement queue, the new advertisement routine 703 simply inserts the advertisement at the bottom of the appropriate advertisement queue. The new advertisement will thus be sorted along with the other advertisements when that advertisement queue becomes the current advertisement queue.

If the newly-received advertisement is a "NO" priority advertisement, it is simply inserted at the end of the NO\_PRIORITY queue even if that queue is the current advertisement queue and the sorting routine 701 is not invoked. Since these advertisements do not generate revenue for the e-mail service provider, it is relatively unimportant whether such advertisements are shown in exactly the right order every time the NO\_PRIORITY queue is processed.

#### Logging Statistical Information

The advertisement display scheduler 700 can maintain statistics regarding each advertisement that it presents to a

user. These statistics are kept in a statistics log file stored on the storage device 206 of the client system 101. Each time a new banner advertisement is displayed, for example, the advertisement display scheduler 700 updates the statistics log file with the identification of the banner advertisement, the time and date it was displayed, and the duration of the display. This information is then used by the advertisement display scheduler 700 in determining which advertisements to display subsequently, and can be used by the server system 104 for billing and reporting purposes. This information can also be used at the server system 104 by the advertisement distribution scheduler and the advertisement download scheduler. Similar statistics are maintained with respect to the presentation of showcase advertisements. The advertisement display scheduler 700 also can maintain an event log file containing information about various system activity including, for example, actions taken by the user (i.e., "clicking" on an advertisement), timeouts, and so on. Moreover, the server system 104 may send billing information and statistics to the advertiser 108.

It will be appreciated that advertisements may also include community service messages, system information messages, colorful and pleasing artwork, photographic works, logos, slogans and the like. The term advertisement includes content that is other than e-mail messages to and from users of the e-mail system. Advertisements can include text, graphics, sound, animations, video, etc. Thus, it will be appreciated that the advertisement display scheduler 700 can be used to schedule the output of these formats of advertisements.

The advertisement distribution scheduler is located at the server system 104. The advertisement distribution scheduler generates an assignment of advertisements to users and their computers. For example, a particular advertisement for orange juice may be assigned by the advertisement distribution scheduler to all residents of New York City and all college students in Boston. Each advertisement has associated with it an ad contract which specifies a demographic profile, reach and frequency, duration and time of expiry for the advertisement. The ad contract can be stored in the database management system 106. Using the information about each user received by the server system 104, the advertisement distribution scheduler assigns advertisements to users. In the representative embodiment, the advertisement distribution scheduler uses information received from the user via the member profile that is stored in the database management system 106 to allocate advertisements. Demographic information collected from other sources can also be used by the advertisement distribution scheduler. Thus, the advertisement distribution scheduler runs database selects on the user demographic information stored in the database management system 106 to produce a list of users for each advertisement.

The advertisement distribution scheduler includes additional functionality that assists in the maximization of advertisement revenues and the minimization of system costs. For example, for each selected user, the advertisement distribution scheduler reviews (1) the usage profile of the user (e.g., statistical information collected in the statistics log file at the user's computer 101) to ascertain expected advertisement consumption over a predetermined period; and (2) the current advertisement load of the user and time to expiry. Thus, advertisements can be allocated to users who are more likely to be exposed to the advertisements prior to the expiration period of the advertisement.

Thus, given an ad contract, the advertisement distribution scheduler computes a set of assignments of advertisements

to users that maximizes potential revenues. Because more than one user may operate a particular client system 101 (e.g., members of a family, employees of a corporation), allocation of advertisements can be aggregated for each client system 101 so that an advertisement need only be transferred once to a client system 101 if more than one user at that client system 101 has been allocated the advertisement. The advertisement distribution scheduler generates an advertisement archive for each client system 101. The advertisement archive can be stored (directly or indirectly) on the mail server  $M_0 \dots M_n$  assigned to that client system 101.

Optionally, the advertisement distribution scheduler can assign advertisements to users on a machine basis rather than a user basis. Thus, the usage profile and current advertisement load discussed above can be aggregated and considered by the advertisement distribution scheduler on a per machine rather than per user basis.

The advertisement download scheduler is located at the server system 104. The advertisement download scheduler controls the transfer of advertisements from a mail server  $M_n$  to a client system 101. At any moment in time, each client system 101 has a given number of advertisements that actually have been downloaded to the client system 101 and a given number of advertisements eligible for download (as determined by the advertisement distribution scheduler) that are stored on a mail server  $M_n$ . Upon any given connection between the client system 101 and the server system 104, the advertisement download scheduler decides which of the advertisements (e.g., the advertisement archives) that are stored on the mail server  $M_n$ , if any, are actually downloaded at that time.

The advertisement download scheduler aims to maximize revenue by optimizing for the number of exposures of an advertisement before expiry of that advertisement. For example, it may not be optimal to download an advertisement one day before expiry if another advertisement can be downloaded that has a week until expiry or to download an advertisement if the user has previously received but not been exposed to many current advertisements. The advertisement download scheduler also aims to spread the advertisement load over all users of a given client system 101.

The advertisement download scheduler delivers advertisements in a timely fashion without overloading any given user, but in a way that maximizes the number of exposures an advertisement can receive before it expires. It is noted that it may be suboptimal to download an advertisement with a large amount of time remaining for its delivery by the advertisement display scheduler 700.

Moreover, the advertisement download scheduler will aim to spread downloading of advertisements during any one connection between the client system 101 and the server system 104. Thus, it is believed preferable to have one advertisement transferred each connection, rather than having four advertisements transferred in a first connection and none in a subsequent three connections. A parameter used in this decision process can also include the number of e-mail messages to be transferred and the transfer time.

In the representative embodiment, each advertisement has associated with it scheduling information that can be used by the advertisement download scheduler to make decisions as to the order and timing of the download of eligible advertisements.

For a given advertisement load assigned to a particular client system 101, the advertisement download scheduler determines which advertisements should be downloaded in

an expected time period (e.g., the next week) and determines the fraction for the given connection based on the percentage of connect time that the current user represents according to historical information about that user's habits (e.g., as stored in the database management system 106). This spreading attempts to share the burden of advertisement downloading amongst all users of a particular client system 101.

The three schedulers of the present invention operate together in an integrated fashion to maximize exposures of relevant advertisements and to minimize system operation costs.

The present invention has been described in the context of a representative embodiment in which users receive e-mail service in exchange for being exposed to vendor advertising. Persons skilled in the art will recognize, however, that the present invention is applicable in any system in which it is desirable to present computer users with a continuously-changing variety of advertisements, particularly while the user is operating the computer that is not connected to a remote server. The principles of the present invention apply to on-line services that present advertising to users while the user is accessing other content. Thus, an e-mail message may be regarded as an example of content provided to a user.

Moreover, while the present invention has been described with reference to representative embodiments having specific features, persons skilled in the art will recognize that many modifications and variations are possible. Accordingly, the present invention embraces all alternatives, modifications and variations that fall within the spirit and scope of the appended claims, as well as all equivalents thereof.

What is claimed is:

1. An apparatus for scheduling the presentation of advertisements on a computer monitor, said apparatus comprising:

- (a) an advertisement queue stored in a memory, said advertisement queue containing a plurality of advertisements having a display portion and a control portion;
- (b) an advertisement sort module for ordering said plurality of advertisements in said advertisement queue according to information contained in said control portion of said advertisements; and
- (c) an advertisement display module for sequentially presenting said display portion of said advertisements on the computer monitor.

2. The apparatus of claim 1 further comprising a plurality of advertisement queues each having associated therewith a unique priority, wherein each of said plurality of advertisements is stored in one of said plurality of advertisement queues according to said control information.

3. The apparatus of claim 2 further comprising means for connecting to a remote computer system to receive said plurality of advertisements and wherein said the advertisement display module comprises means for presenting said advertisements on the computer monitor when not connected to the remote computer system.

4. An advertisement scheduler for presenting a plurality of advertisements on a computer monitor, said advertisement scheduler comprising:

- (a) a communications interface enabling said advertisement scheduler to receive an advertisement transmitted from a remote source over a computer network;
- (b) an advertisement processor for assigning a received advertisement to one of a plurality of prioritized advertisement queues; and
- (c) an advertisement display module for designating one of said prioritized advertisement queues as a current

advertisement queue and sequentially presenting one or more advertisements in said current advertisement queue on the computer monitor.

5. The advertisement scheduler of claim 4 further comprising a sort module for reordering said advertisements in said current advertisement queue according to a predetermined scheduling parameter.

6. The advertisement scheduler of claim 4 wherein said advertisement display module operates to present said one or more advertisements on the computer monitor when the advertisement scheduler is not connected to said computer network.

7. The advertisement scheduler of claim 4 wherein said advertisement processor comprises means for deleting a first advertisement from said prioritized advertisement queues if said first advertisement is designated as conflicting with a second advertisement in said prioritized advertisement queues.

8. A scheduling system for outputting advertisements to a user of an electronic mail system, the electronic mail system having a user component and a server component capable of communicating with one another over a computer network, said scheduling system comprising:

- (a) a communications interface enabling said scheduling system to receive advertisements transmitted from the server component of the electronic mail system, wherein each of said transmitted advertisements includes scheduling information;
- (b) an advertisement processor for assigning each of said plurality of advertisements to one of a plurality of prioritized advertisement queues based on said scheduling information, wherein each of said prioritized advertisement queues may contain a plurality of stored advertisements;
- (c) an advertisement output module for designating one of said prioritized advertisement queues as a current advertisement queue, sorting said plurality of stored advertisements in said current advertisement queue according to said scheduling information and sequentially outputting each of said stored advertisements in an order determined by said sorting.

9. The scheduling system of claim 8 wherein said plurality of prioritized advertisement queues are stored locally in a memory coupled to the user component of the electronic mail system.

10. The scheduling system of claim 9 wherein said advertisements are received from the server component and output to the user independently of electronic mail advertisements.

11. The scheduling system of claim 10 wherein the electronic mail system is disabled if one of said plurality of prioritized advertisement queues is altered in any manner by other than by the scheduling system.

12. The scheduling system of claim 10 wherein said scheduling system monitors the user component and terminates said output of advertisements when the user component is inactive for a predetermined period of time.

13. A method for displaying a plurality of advertisements on a computer monitor, wherein each of the plurality of advertisements includes a display portion and a control portion, said method comprising:

- (a) assigning each of the plurality of advertisements to one of a plurality of prioritized advertisement queues according to a priority code contained in the control portion of the advertisement, wherein each of said prioritized advertisement queues is associated with a unique priority;

- (b) designating one of said plurality of prioritized advertisement queues having a highest priority as a current advertisement queue;
- (c) sorting the advertisements in said current advertisement queue according to a scheduling code contained in the control portion of the advertisement;
- (d) sequentially displaying each of the advertisements in said current advertisement queue on the computer monitor; and
- (e) repeating steps (b) through (d) to sequentially display the advertisements in each of said plurality of prioritized advertisement queues, wherein said prioritized advertisement queues are processed in an order of decreasing priority as determined by said unique priority code associated therewith.

14. The method of claim 13 wherein said sorting step comprises determining which of a first advertisement and a second advertisement has a higher priority by comparing a set of scheduling parameters associated with said first advertisement to a corresponding set of scheduling parameters associated with said second advertisement.

15. The method of claim 14 wherein said sorting step further comprises calculating a set of delta values representing differences between said scheduling parameters of said first advertisement and corresponding scheduling parameters of said second advertisement.

16. The method of claim 15 wherein said sorting step further comprises solving a hyperplane equation using said set of delta values and a corresponding set of scheduling constants to identify which of said first and second advertisements has the higher priority.

17. The method of claim 16 further comprising a step of updating said control portion of an advertisement after said advertisement is displayed.

18. The method of claim 17 wherein said set of scheduling parameters includes a date after which an advertisement can no longer be displayed.

19. The method of claim 17 wherein said set of scheduling parameters includes a maximum number of times an advertisement may be displayed.

20. The method of claim 19 wherein said set of scheduling parameters includes a percentage of said maximum number of times that an advertisement has already been displayed.

21. The method of claim 17 wherein said set of scheduling parameters includes a period of time since an advertisement was last displayed.

22. The method of claim 21 wherein said advertisements comprise sound information.

23. A method for displaying advertisements to a user of an electronic mail system, the electronic mail system having a user component and a server component capable of communicating over a computer network, said method comprising:

- (a) transmitting a plurality of data packets from the server component of the electronic mail system to the user component, wherein each of said data packets includes an advertisement and associated scheduling information;
- (b) storing each of said data packets in one of a plurality of advertisement queues based on said scheduling information;
- (c) designating one of said advertisement queues as a current advertisement queue;
- (d) sorting said data packets in said current advertisement queue based on said scheduling information;
- (e) sequentially displaying each of said advertisements in said current advertisement queue to the user;

(f) updating said scheduling information for each of said advertisements displayed; and

(g) repeating steps (e) through (f) to display said advertisements in each of said advertisement queues.

24. The method of claim 23 further comprising a step of logging statistical information relating to said sequential display of advertisements.

25. The method of claim 24 further comprising a step of periodically transmitting said statistical information from said user component to said server component.

26. The method of claim 25 wherein said server component uses said statistical information to bill a sponsor of an advertisement.

27. A method for displaying advertisements to a user of an electronic mail system, the electronic mail system having a user component and a server component capable of communicating over a computer network, said method comprising:

(a) establishing a network connection between the user component and the server component;

(b) transmitting a plurality of data packets from the server component to the user component, wherein each of said data packets includes an advertisement and associated scheduling information;

(c) storing each of said data packets in one of a plurality of prioritized advertisement queues based on said scheduling information, wherein said prioritized advertisement queues reside in a local memory coupled to the user component;

(d) designating one of said prioritized advertisement queues as a current advertisement queue;

(e) sorting said data packets in said current advertisement queue based on said scheduling information;

(f) sequentially displaying each of said advertisements in said current advertisement queue to a user when no network connection is established between the user component and the server component; and

(g) repeating steps (c) through (f) to continuously display said advertisements in each of said prioritized advertisement queues.

28. The method of claim 27 further comprising a step of updating said scheduling information of an advertisement to reflect a display of said advertisement to the user.

29. The method of claim 28 further comprising a step of logging statistical information relating to said sequential display of advertisements.

30. The method of claim 29 further comprising a step of periodically transmitting said statistical information from said user component to the server component.

31. The method of claim 27 further comprising a step of displaying an advertisement to a user while a network connection is being established between the user component and the server component.

32. The method of claim 31 further comprising a step of displaying an advertisement to a user while the server component is transmitting data packets to the user component.

33. The method of claim 31 further comprising a step of displaying an advertisement to a user concurrently with, but independently of, the server component downloading an electronic mail advertisement to the user component.

34. A method for displaying advertisements to a user of an electronic mail system, the electronic mail system having a user component and a server component capable of communicating over a computer network, said method comprising:

- (a) establishing a network connection between the user component and the server component;
- (b) transmitting a plurality of data packets from the server component to the user component, wherein each of said data packets includes an advertisement, an advertisement type indicator, and associated scheduling information;
- (c) storing each of said data packets in one of a first and second set of queues based on said advertisement type indicator, said first set of queues comprising a plurality of prioritized advertisement queues for data packets having a first advertisement type, wherein said data packet is assigned to one of said plurality of prioritized advertisement queues based on said scheduling information, and said second set of queues comprising one or more advertisement queues for data packets having a second advertisement type;
- (d) designating one of said plurality of prioritized advertisement queues as a current advertisement queue;
- (e) sorting said data packets in said current advertisement queue based on said scheduling information;
- (f) sequentially displaying each of said advertisements in said current advertisement queue to a user; and
- (g) repeating steps (c) through (f) to continuously display said advertisements in each of said plurality of prioritized advertisement queues while the user is operating the user component of the electronic mail system.

35. The method of claim 34 wherein said advertisements are displayed to the user while no network connection is established between the user component and the server component.

36. The method of claim 35 further comprising a step of sequentially displaying said advertisements in said second set of queues while said network connection between the user component and the server component is being established.

37. The method of claim 36 further comprising a step of sequentially displaying said advertisements in said second set of queues while a data packet is being transmitted from the server component.

38. The method of claim 37 further comprising a step of displaying an advertisement to a user concurrently with, but independently of, the server component downloading an electronic mail advertisement to the user component.

39. An advertisement scheduling system to schedule the transfer and output of advertisements in a computer network, the computer network including a server system and a plurality of user computers capable of connecting to and disconnecting from the server system, comprising:

- an advertisement distribution schedule, located at the server system, determining, for each advertisement, which user computers are eligible to receive said advertisement, and thereafter associating said advertisements with each eligible user computer.

an advertisement download scheduler, located at the server system, determining when to transmit advertisements to eligible user computers;

a memory device, located at each one of said user computers, to store advertisements transmitted from the server system; and

an advertisement display scheduler, located at each one of said user computers, determining when to output advertisements stored on the memory device of said user computer.

40. The system of claim 39 wherein advertisements are output at said user computers when said user computers are not connected to the server system.

41. The system of claim 39 further comprising, at the server system, a plurality of e-mail servers.

42. The system of claim 41 further comprising, at the user computers, means for reading e-mail and means for writing e-mail, and wherein the advertisements are output at said user computers when said user computers are enabling users to read e-mail and write and when not connected to the server system.

43. A method for outputting advertisements received from a remote computer at a user computer, comprising the steps of:

providing a priority queue at the user computer for prioritizing advertisements;

electronically receiving an advertisement from the remote computer over a communications link;

storing the received advertisement on a memory device of the user computer;

at the user computer, allocating the advertisement to the priority queue;

determining if the received advertisement conflicts with a second advertisement on the priority queue, and if so, deleting the second advertisement from the priority queue; and

outputting the advertisement at the user computer according to said advertisement's position on the priority queue.

44. The method of claim 43 wherein each advertisement comprises an advertisement archive including information identifying conflicting advertisements.

45. The method of claim 44 further comprising the step of replacing the deleted second advertisement on the priority queue after a predetermined period of time.

46. The method of claim 45 wherein the predetermined period of time is one pass through the priority queue.

47. The method of claim 43 wherein the step of outputting the advertisement further comprises the step of retrieving the advertisement from the memory device of the user computer.

48. The method of claim 43 wherein the step of outputting the advertisement occurs when the user computer is not connected to the remote computer.

\* \* \* \*

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: Jeffry Jovan Philyaw and David Kent Matthews  
Serial No.: 09/382,423  
Confirmation No.: 5217  
Filed: August 24, 1999  
Group: 2623  
Examiner: Rueben M. Brown  
For: METHOD AND APPARATUS FOR UTILIZING AN AUDIBLE  
SIGNAL TO INDUCE A USER TO SELECT AN E-COMMERCE  
FUNCTION

Mail Stop AF  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

**AMENDMENT AND RESPONSE TO FINAL OFFICE ACTION**

This communication is responsive to the Examiner's Office Action mailed October 5, 2006.

**Amendments to the Claims** are reflected in the listing of claims beginning on page 2 of this paper.

**Remarks/Arguments** begin on page 4 of this paper.

## In the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (Previously Presented): A method for delivering advertising to a consumer over a broadcast media/global communication network combination, comprising the steps of:

generating an advertisement broadcast comprised of a general program having non-advertising content and associated advertising content dispersed therethrough for broadcast over a broadcast media which is directed to a general class of consumers;

5 embedding in the broadcast unique information for inducing a consumer to view the broadcast for later access to a desired advertiser's location on the global network system over a personal computer-based system;

10 broadcasting to the potential class of consumers the advertisement broadcast with the embedded unique information therein such that the embedded unique information is presented to the consumer in the same manner as the advertisement broadcast;

15 wherein the unique information is dispersed throughout the advertisement broadcast at different times therein such that the user is induced by at least a first portion of the received unique information to access the desired advertiser's location after a predetermined time in the broadcast and wherein the location of at least a second portion of the unique information in the program broadcast is associated with the non-advertising content of the program broadcast proximate in time thereto, wherein the unique information that is provided at different times in the general broadcast comprises the at least a first portion for informing the consumer that an access will be available at another desired time or the at least a second portion that is delivered to 20 the consumer at the another desired time for allowing the user to access the desired advertiser location through the personal computer-based system; and

accessing the desired advertiser's location proximate the another desired time in the program.

Claim 2 (Original): The method of Claim 1, and further comprising the steps of:

activating a network or server at the advertiser's location to wait for a response in the form of a network connection to the advertiser's location by a potential consumer; and

5 upon receiving a response from one of the potential consumers, providing additional information to that contained within the advertisement broadcast.

Claim 3 (Canceled)

Claim 4 (Previously Presented): The method of Claim 1, wherein the unique information includes information that is to be transferred to the advertiser's location in the step of accessing.

Claim 5 (Original): The method of Claim 4, wherein the unique information that is to be transferred to the desired location is automatically transferred to the advertiser's location when access of the desired advertiser's location is made.

Claim 6 (Canceled)

Claim 7 (Previously Presented): The method of Claim 1, wherein additional information is provided by the advertiser to the consumer at the another time which additional information is transferred to the desired advertiser's location during the step of accessing.

Claim 8 (Previously Presented): The method of Claim 1, wherein the second portion of the unique information comprises a tone being a substantially unique sound recognizable by the consumer.

Claim 9 (Previously Presented): The method of Claim 8, wherein the tone has embedded therein information that can be decoded by the personal computer-based system and which encoded information is transferred to the desired advertiser's location upon access thereof over the global communication network system.

Claim 10 (Previously Presented): The method of Claim 1, wherein the unique information comprises a video image being a substantially unique appearance recognizable by the consumer.

Claim 11(Previously Presented): The method of Claim 10, wherein the video image has embedded therein information that can be decoded by the personal computer-based system and which encoded information is transferred to the desired advertiser's location upon access thereof over the global communication network system.

## REMARKS

Applicants have carefully reviewed the Office Action dated October 5, 2006. Reconsideration and favorable action is respectfully requested.

The Examiner has responded to Applicants last filed response in some detail. In paragraph 1 of the Examiner's response, the Examiner sets forth as follows:

Applicant's arguments file 8/8/2006 have been fully considered but are not persuasive. Applicant's main argument is that the advertisement alert in *Kitsukawa* is contemporaneous with the program, such that it cannot be at "different times". However, *Kitsukawa* clearly teaches that any particular scene in the video broadcast may be used to carry an advertisement, since the advertisement may be associated with any particular item in a video broadcast scene, see col. 8, lines 51-65 through col. 9, lines 1-51.

The Examiner indicated that the Applicants main argument was that the advertisement alert was "contemporaneous" with the program such that it cannot be at "different times." However, what Applicants basically stated was that "the particular icons associated with the advertisements are displayed in conjunction with the particular subject matter." The subject of the argument is that the subject matter associated with the advertisement is displayed and a particular icon is displayed at substantially the same time. Although the Examiner is correct that *Kitsukawa* teaches that any particular scene can be used to carry an advertisement, it is the fact that the advertisement is associated with an icon at a particular time in a broadcast, but there is no disclosure of unique information that is transmitted at different times in the broadcast that are different from when the non-advertising content is displayed. All that is displayed in *Kitsukawa* is the advertising content in conjunction with a particular and associated portion of the program.

The second portion of the Examiner's argument is with respect to paragraph 2 of the Examiner's Response to Arguments. This is set forth as follows:

Applicant also argues on page 5 that, "Examiner has utilized *Yuen*

for this purpose. The Examiner has cited the portion of the background which is similar to Applicant's description of prior art, that being where a normal operation is to provide some type of announcement at some time in the day to induce a listener to tune in at a later time. However, the present invention utilizes the pre-announcement as part of the program itself." Examiner points out that the combination of *Kitsukawa* and *Yuen* still meets this claim, since the advertisement in *Kitsukawa* is part of the program itself, as characterized by col. 9, lines 64-67.

In this portion, the Examiner indicates that the advertisement in *Kitsukawa* is part of the program and, therefore, this would suggest that the pre-announcement portion were also part of the program. However, the Examiner is not pointing to anything in the combination of *Yuen* and *Kitsukawa* that in any way shows that there can be a pre-announcement portion and a second portion that is associated with non-advertising content wherein both occur at different times but are still part of the same program. Applicants clearly pointed this out in the last response.

The third aspect of the Examiner's argument was that the additional claim feature "or the at least second portion that is delivered to the consumer at another desired time for allowing the user to access a desired advertiser location through the PC based system" is an additional feature that is recited in the alternative and thus is not required to be addressed. Applicants disagree with this. The claim requires that unique information be dispersed throughout the advertisement broadcast, wherein, in line 10 of claim 1, the unique information is referred to as "embedded unique information" that is presented to the consumer in the "same manner" as the advertisement broadcast. However, there is nothing to say that the unique information is comprised of one piece of information. Rather, in Claim 1, it is set forth that the unique information comprises a first portion for inducing the user "and" there is provided a second portion of unique information that is associated with a non-advertising content of the program broadcast. It is then set forth that the unique information is provided at different times wherein the first portion is for informing the consumer or it is the first portion for inducement. This language merely states that when unique information occurs, it is either the first portion or the second portion, it clearly being set forth in the claim that the unique information is comprised of a first portion and a second portion. Thus, the term "or" refers to the fact that when unique information is present in a program, this being a temporal concept, it is either the first portion or the second portion.

Applicant believes that the Examiner is incorrect in not addressing this aspect of the claim. Applicant believes that the claim is clear as to the language.

The Examiner has reiterated the rejections of the claims substantially as previously presented. Applicant believes that the Examiner is incorrect in his understanding of the claim and respectfully requests reconsideration in view of these arguments. As such, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection with respect to claims 1-5 and 7-11 in view of the combination of *Kitsukawa* and *Yuen*.

The remaining claims, claims 4-5, 7, 9 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of *Kitsukawa* and *Yuen*, and further in view of *Marsh*, (U.S. Patent No. 5,848,397). This rejection is respectfully traversed.

The addition of the *Marsh* reference, as set forth in the previous response, does not cure the deficiencies noted herein above with respect to *Kitsukawa* by itself and, more importantly, with the combination of *Yuen* therewith. Therefore, Applicants respectfully request withdrawal of the 35 U.S.C. § 103(a) rejection with respect to claims 4-5, 7, 9 and 11.

Applicants have now made an earnest attempt in order to place this case in condition for allowance. For the reasons stated above, Applicants respectfully request full allowance of the claims as amended. Please charge any additional fees or deficiencies in fees or credit any overpayment to Deposit Account No. 20-0780/PHLY-24,739 of HOWISON & ARNOTT, L.L.P.

Respectfully submitted,  
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April 4, 2007

LEXSEE 464 F.3D 1286

ALZA CORPORATION, Plaintiff-Appellant, v. MYLAN LABORATORIES, INC.  
and MYLAN PHARMACEUTICALS, INC., Defendants-Appellees.

06-1019

## UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

464 F.3d 1286; 2006 U.S. App. LEXIS 22616; 80 U.S.P.Q.2d (BNA) 1001

September 6, 2006, Decided

**SUBSEQUENT HISTORY:** Related proceeding at *Alza Corp. v. Impax Labs.*, 193 Fed. Appx. 973, 2006 U.S. App. LEXIS 22800 (Fed. Cir., Sept. 6, 2006)

**PRIOR HISTORY:** [\*\*1]Appealed from: United States District Court for the Northern District of West Virginia. Chief Judge Irene M. Keeley.

*Alza Corp. v. Mylan Labs., Inc.*, 388 F. Supp. 2d 717, 2005 U.S. Dist. LEXIS 22272 (N.D. W. Va., 2005)

**DISPOSITION:** AFFIRMED.

**COUNSEL:** Gregory L. Diskant, Patterson, Belknap, Webb & Tyler LLP, of New York, New York, argued for plaintiff-appellant. With him on the brief were Jeffrey I.D. Lewis, and Richard J. McCormick.

John B. Wyss, Wiley, Rein, & Fielding LLP, of Washington, DC, argued for defendants-appellees. With him on the brief were James H. Wallace, Jr., Kevin P. Anderson, and Robert J. Scheffel.

**JUDGES:** Before GAJARSA, Circuit Judge, CLEVENGER, Senior Circuit Judge, and PROST, Circuit Judge.

**OPINION BY:** GAJARSA

**OPINION**

[\*1288] GAJARSA, *Circuit Judge.*

Alza Corp. ("Alza") appeals from the district court's judgment, after a bench trial, of noninfringement and invalidity of claims 1-3, 11, 13 and 14 of *U.S. Patent No.*

6,124,355<sup>1</sup> ("the '355 *patent*") in favor of Mylan Laboratories, Inc. and Mylan Pharmaceuticals, Inc. (collectively, "Mylan"). *Alza Corp. v. Mylan Labs., Inc.*, 388 F. Supp. 2d 717 (N.D. W. Va. 2005) ("Alza II"). The infringement arose from Mylan's filing of two Abbreviated New Drug Applications ("ANDAs") for a generic version of the once-a-day extended release [\*\*2] formulation of the anti-incontinence drug oxybutynin, *id.* at 720, which Alza has been marketing as Ditropan XL(R). *Id.* at 738. This court has jurisdiction pursuant to 28 U.S.C. § 1295(a)(1). For the reasons stated below, we affirm the district court's judgment of noninfringement and invalidity.

1. The '355 *patent* issued to Guittard et al. and was assigned to Alza.

**I. BACKGROUND**

This litigation arose from Mylan's and Impax's filings of ANDAs for once-daily, controlled-release oxybutynin formulations. Oxybutynin is a drug used to treat urinary incontinence. Once-a-day dosing provides the usual benefits of convenience, steady-dosing, and in addition, possibly reduced absorption of a metabolite that leads to side-effects. Claim 2 of the '355 *patent* is representative.

2. A sustained-release oxybutynin formulation for oral administration to a patient in need of treatment for urge incontinence comprising a therapeutic dose of an oxybutynin selected from the group consisting of oxybutynin and its pharmaceutically acceptable salt that *delivers* from 0 to 1 mg in 0 to 4 hours,

464 F.3d 1286, \*1288; 2006 U.S. App. LEXIS 22616, \*\*2;  
80 U.S.P.Q.2D (BNA) 1001

from 1 mg to 2.5 mg in 0 [\*\*3] to 8 hours, from 2.75 to 4.25 mg in 0 to 14 hours, and 3.75 mg to 5 mg in 0 to 24 hours for [\*1289] treating urge incontinence in the patient.

col. 17, ll. 31-38 (emphasis added).

The district court construed the '355 patent claims in its *Markman* Order, reported at *Alza Corp. v. Mylan Labs., Inc.*, 349 F. Supp. 2d 1002 (N.D.W. Va. 2004) ("Alza I"). The court construed the word "deliver" to refer to the rate of *in vivo* release in the gastrointestinal ("GI") tract. *See id.* at 1019.

Alza did not present direct evidence that Mylan's ANDA formulation released drug in the GI tract at the rates claimed by the '355 patent. However, it did offer two other types of evidence: 1) the rate at which the generic product released oxybutynin in an *in vitro* dissolution apparatus, and 2) the rate at which the ANDA product resulted in the accumulation of oxybutynin in the bloodstream.

The district court found that Alza had failed to meet its burden of proof on infringement. The district court also found the asserted claims of the '355 patent to be invalid as both anticipated and obvious in light of the prior art. For the reasons stated below, we affirm [\*\*4] the invalidity holding on obviousness grounds, and consequently, we do not need to reach Alza's arguments regarding anticipation. We also affirm the holding of noninfringement.

## II. DISCUSSION

### A. Standard of review

Infringement is a question of fact that, after a bench trial, we review for clear error. *See, e.g., Ferguson Beauregard/Logic Controls, Div. of Dover Res., Inc. v. Mega Six, LLC*, 350 F.3d 1327, 1338 (Fed. Cir. 2003). Under the clear error standard, a reversal is permitted only when this court is left with a definite and firm conviction that the district court was in error. *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1164 (Fed. Cir. 2006).

As for obviousness, a claimed invention is unpatentable if the differences between it and the prior art are "such that the subject matter as a whole would have

been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103(a) (2000); *In re Kahn*, 441 F.3d 977, 985 (Fed. Cir. 2006) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 13-14, 86 S. Ct. 684, 15 L. Ed. 2d 545, (1966)). Obviousness is a question [\*\*5] of law, reviewed *de novo*, based upon underlying factual questions which are reviewed for clear error following a bench trial. *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1275 (Fed. Cir. 2004). These "underlying factual inquiries includ[e]: (1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness." *In re Dembicczak*, 175 F.3d 994, 998 (Fed. Cir. 1999). Similarly, "[t]he presence or absence of a motivation to combine references in an obviousness determination is a pure question of fact," *In re Garside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000); accord *Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1348 (Fed. Cir. 2000), as is the presence or absence of a "reasonable expectation of success" from making such a combination. *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006). Because "a patent retains its statutory presumption of validity, *see* 35 U.S.C. § 282, . . . the movant retains the burden to show the invalidity [\*\*6] of the claims by clear and convincing evidence as to underlying facts." *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1349 (Fed. Cir. 2001) (internal quotations omitted).

In *Graham*, the Court held that the obviousness analysis begins with several basic factual inquiries: "[1] the scope [\*1290] and content of the prior art are to be determined; [2] differences between the prior art and the claims at issue are to be ascertained; and [3] the level of ordinary skill in the pertinent art resolved." 383 U.S. at 17. After ascertaining these facts, the Court held that the obviousness *vel non* of the invention is then determined "against the background" of the *Graham* factors. *Id.* at 17-18 (emphasis added). Clearly, the Court recognized the importance of guarding against hindsight, as is evident in its discussion of the role of secondary considerations as "serv[ing] to guard against slipping into use of hindsight and to resist the temptation to read into the prior art the teachings of the invention in issue." *Id.* at 36.

The Court of Appeals for the Federal Circuit's and its predecessor's "motivation [\*\*7] to combine" requirement likewise prevents statutorily proscribed hindsight

464 F.3d 1286, \*1290; 2006 U.S. App. LEXIS 22616, \*\*7; 80 U.S.P.Q.2D (BNA) 1001

reasoning when determining the obviousness of an invention. *Kahn*, 441 F.3d at 986 ("[T]he 'motivation-suggesting-teaching' requirement protects against the entry of hindsight into the obviousness analysis."); *In re Fridolphi*, 30 CCPA 939, 942, 134 F.2d 414, 1943 Dec. Comm'r Pat. 350 (1943) ("[I]n considering more than one reference, the question always is: does such art suggest doing the thing the [inventor] did."). According to the "motivation-suggesting-teaching" test, a court must ask "whether a person of ordinary skill in the art, possessed with the understandings and knowledge reflected in the prior art, and motivated by the general problem facing the inventor, would have been led to make the combination recited in the claims." *Kahn*, 441 F.3d at 988 (citing *Cross Med. Prods., Inc., v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1321-24 (Fed. Cir. 2005)).

This requirement has been developed consistent with the Supreme Court's obviousness jurisprudence as expressed in *Graham* and the text of the obviousness statute that directs us to conduct the obviousness [\*\*8] inquiry "at the time the invention was made" 35 U.S.C. § 103. As we explained in *Kahn*,

The motivation-suggestion-teaching test picks up where the analogous art test leaves off and informs the *Graham* analysis. To reach a non-hindsight driven conclusion as to whether a person having ordinary skill in the art at the time of the invention would have viewed the subject matter as a whole to have been obvious in view of multiple references, the Board must provide some rationale, articulation, or reasoned basis to explain why the conclusion of obviousness is correct. The requirement of such an explanation is consistent with governing obviousness law

....

441 F.3d at 987. We further explained that the "motivation to combine" requirement "[e]ntails consideration of both the 'scope and content of the prior art' and 'level of ordinary skill in the pertinent art' aspects of the *Graham* test." *Id.* at 986.

At its core, our anti-hindsight jurisprudence is a test that rests on the unremarkable premise that legal determinations of obviousness, as with such

determinations generally, should be based on evidence rather [\*\*9] than on mere speculation or conjecture. Our court's analysis in *Kahn* bears repeating:

A suggestion, teaching, or motivation to combine the relevant prior art teachings does not have to be found explicitly in the prior art, as "the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references. . . . The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be [\*\*1291] solved as a whole would have suggested to those of ordinary skill in the art." However, rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be *some* articulated reasoning with *some* rational underpinning to support the legal conclusion of obviousness. This requirement is as much rooted in the Administrative Procedure Act [for our review of Board determinations], which ensures due process and non-arbitrary decisionmaking, as it is in § 103.

441 F.3d at 987-88 (quoting *In re Kotzab*, 217 F.3d 1365, 1370 (Fed. Cir. 2000)) (citations omitted) (emphases added). There is [\*\*10] flexibility in our obviousness jurisprudence because a motivation may be found *implicitly* in the prior art. We do not have a rigid test that requires an actual teaching to combine before concluding that one of ordinary skill in the art would know to combine references. This approach, moreover, does not exist merely in theory but in practice, as well. Our recent decisions in *Kahn* and in *Cross Medical Products* amply illustrate the current state of this court's views. See *Kahn*, 441 F.3d at 988 (affirming the PTO's obviousness finding, explaining that a motivation to combine may be found in implicit factors, such as the "knowledge of one of ordinary skill in the art, and [what] the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art"); *Cross Med. Prods.*, 424 F.3d at 1322 (reversing a district court ruling of nonobviousness and explaining that "the motivation to combine need not be found in prior art references, but equally can be found in the knowledge

generally available to one of ordinary skill in the art" such as knowledge of a problem to be solved).

In conclusion, our approach has [\*11] permitted us to continue to address an issue of law not readily amenable to bright-line rules, as we recall and are guided by the wisdom of the Supreme Court in striving for a "practical test of patentability." *Graham*, 383 U.S. at 17.

#### B. Description of the technology

The patent at issue is directed generally to an extended release form of oxybutynin. Because the subject matter of the patent falls roughly under the rubric of pharmacology, we give a brief orientation to the field, based upon the record. In general, when a drug is swallowed, it is (1) dissolved in the gastrointestinal ("GI") tract; (2) absorbed from the GI tract into the bloodstream; (3) distributed from the blood into body tissues; and (4) metabolized and eliminated from the bloodstream. The GI tract includes the stomach, small intestine and the colon, and orally administered drugs pass through these portions of the GI tract in turn. Drugs may be administered in different dosage forms,<sup>2</sup> which may include not only the drug itself but also ingredients intended to modulate the rate of release of the drug from the dosage form.

2 Here we are discussing oral dosage forms, specifically.

[\*12] Dosage forms may be described as immediate-release, e.g., such as where the drug is quickly released in the stomach, or as sustained/extended-release, where the drug is slowly released as the formulation traverses the GI tract. The rate of absorption of a drug from the GI tract into the bloodstream may change as it passes through the GI tract. The rate of absorption for a dissolved drug in a given portion of the GI tract also varies from drug to drug.

After roughly 8-12 hours a typical dosage form will reach the colon. If, hypothetically, a particular drug is simply not absorbed from the colon into the bloodstream, [\*1292] then it may make little sense to develop an extended-release dosage form that is capable of "withholding" the release of some fraction of that drug until it reaches the colon. In other words, under these hypothetical conditions, there may be little motivation to design an oral dosage form capable of releasing drug more slowly than over an approximately 8-12 hour time

course, because such drug would be released in the colon, where it is (hypothetically) not absorbed.

The '355 patent claims an extended release oxybutynin formulation. Alza argues that one of ordinary [\*13] skill in the art would not have believed that oxybutynin could be absorbed in the colon. Absent such absorption, Alza contends that one of ordinary skill in the art lacked the motivation to make the claimed extended release formulation, and that the district court therefore erred in holding that the asserted claims are invalid as obvious over the prior art. For the reasons set forth below, Alza's arguments fail.

#### C. Invalidity

The district court based its invalidity holding both on anticipation and obviousness grounds. Because we affirm its holding based on obviousness, we do not need to address the parties' anticipation arguments.

In finding the asserted claims of the '355 patent to be obvious, the district court considered, *inter alia*, the following prior art: U.S. Patent Nos. 5,399,359 ("the Baichwal patent"); 5,082,688 ("the Wong patent"); and 5,330,766 ("the Morella patent").

The Morella patent discloses a "sustained-release pharmaceutical composition including an active ingredient of high solubility in water . . ." According to the specification, highly soluble drugs had posed special challenges for the development of sustained release forms, which the inventors [\*14] had set out to solve. "Sustained-release" is defined as release of the active ingredient at a rate that maintains therapeutic, non-toxic blood levels "over an extended period of time e.g. 10 to 24 hours or greater." Highly water soluble drugs were considered to be those having an aqueous solubility of at least roughly 1 part in 30. The commercially available hydrochloride salt of oxybutynin is freely soluble at neutral pH. The patent uses morphine as an example of an active ingredient that can be used in its compositions. Figure 5 demonstrates that one such composition is capable of dispensing morphine at what appears to be an approximately steady rate over the course of 24 hours. Claim 2 of the patent claims "genitourinary smooth muscle relaxants" as one of several types of active ingredients to use in the dosage form identified in claim 1. The specification also identifies oxybutynin as a highly water soluble genitourinary smooth muscle relaxant. Morella also teaches that "the dissolution rate of the

soluble drug at various pH's can be modified at will."

The Baichwal patent teaches a 24 hour extended release oxybutynin formulation. These formulations use an enteric-coated polymer [\*\*15] matrix similar to Mylan's accused product. It also teaches methods of modifying the dosage forms to slow the release rates. During prosecution of the '355 patent, the inventor overcame an anticipation rejection by arguing that his invention had a release rate slower than those of the dissolution data presented in Baichwal.<sup>3</sup> The examiner agreed and withdrew his rejection.

3 Tables 15 and 18 of Baichwal, for example, disclose *in vitro* dissolution rates in which roughly half of the drug is dissolved by four hours.

[\*1293] The Wong patent teaches a bilayer osmotic pump dosage form ("the OROS system") used in the preferred embodiment of the '355 patent. Wong teaches that this system can be used to deliver any drug over a 24 hour period, and Figure 11 of the patent discloses release rates falling within the claimed release rates of the '355 patent. The Wong patent does not specifically teach using oxybutynin with the claimed release technology, but it does teach using several categories of drugs of which oxybutynin is a member, such as anti-cholinergics, analgesics, muscle relaxants and urinary tract drugs.

In analyzing the obviousness issue, the district court first [\*\*16] identified the level of ordinary skill in the art, finding the person of ordinary skill to have either an advanced degree in pharmacy, biology, chemistry or chemical engineering and at least two years of experience with controlled-release technology; or a bachelor's degree in one (or more) of those fields plus five years of experience with such technology. Second, the court examined whether there was a motivation "in the prior art or elsewhere that would have led one of the ordinary skill in the art to combine references," *Alza II*, 388 F. Supp. 2d at 737 (citing *Ruiz*, 234 F.3d 654 at 664 (internal quotations omitted)), and with a "reasonable expectation of success," *id* (citing *In re O'Farrell*, 833 F.2d 894, 904 (Fed. Cir. 1988)). Third, the district court examined secondary considerations of nonobviousness. After making these factual determinations, it concluded that Mylan had established a strong *prima facie* case of obviousness, which Alza had failed to rebut through secondary considerations. The court concluded that Mylan had demonstrated Alza's patent to be invalid for

obviousness by clear and convincing evidence.<sup>4</sup> We agree. [\*\*17]

4 Having reviewed Alza's sundry contentions that the district court made findings inconsistent with the appropriate burdens of proof for infringement and invalidity, we find them to be without merit.

While we have carefully considered all of the parties' arguments, we discuss principally the dispute over satisfaction of one predicate to a finding of obviousness: that a person of ordinary skill in the art would have had a "motivation to combine" the prior art to achieve the claimed invention and that she would have had a "reasonable expectation of success" in doing so. As an initial matter, we agree with the district court that "on a purely mechanical level, a person of ordinary skill in the art would have a reasonable expectation of success of manufacturing a 24 hour controlled-release oxybutynin formulation . . . once motivated to use oxybutynin." *Id.* at 739. For example, Wong teaches a rate adjustable extended release dosing technology and release rates falling within the claimed parameters. Baichwal and Wong likewise teach ways of achieving slow rates of release, with Baichwal actually teaching extended-release oxybutynin, although arguably not as [\*\*18] slowly as is claimed in the '355 patent.<sup>5</sup>

5 The patent examiner initially rejected the '355 patent as anticipated by Baichwal, but subsequently allowed its issuance.

Indeed, Alza's principal argument is that no one of ordinary skill in the art would have been motivated to adapt the Morella, Baichwal and Wong technology to oxybutynin *in the first place*, because a person of ordinary skill in the art would have had no reason to expect that such an extended release oxybutynin formulation would have therapeutic value. The issues, as explained above, reduce essentially to whether one of ordinary skill in the art in 1995 would have had a reasonable expectation [\*1294] that oxybutynin would be colonically absorbed and therefore would have been motivated to produce the claimed extended release formulation.

The district court concluded that "the weight of the evidence clearly and convincingly establishes that a person of ordinary skill in the art in 1995 would reasonably expect oxybutynin to absorb in the colon . . .

464 F.3d 1286, \*1294; 2006 U.S. App. LEXIS 22616, \*\*18; 80 U.S.P.Q.2D (BNA) 1001

[and] have a reasonable expectation of success of producing a 24 hour oxybutynin formulation meeting the claims of the '355 patent."<sup>6</sup> *Alza II*, 388 F. Supp. 2d at 740. [\*\*19] Alza argues, however, that the district court erred because "[t]here was no prior art evidence supporting this finding." According to Alza, "[t]here was no contemporaneous documentation supporting the view that any one factor—lipophilicity or anything else—existed to identify successful candidates for once-a-day delivery." It also argues that two prior art references "decisively undercut" the opinion of Mylan's expert, Dr. Amidon, which the district court cited in support of its conclusion. *See Alza II*, 388 F. Supp. 2d at 739-740.

6 The '355 patent issued on September 26, 2000 and claimed priority as far back as 1995. *See '355 patent*, col. 1, ll. 5-12. The district court treated 1995 as the relevant date for the obviousness inquiry, *see Alza II*, 388 F. Supp. 2d at 740, as do both parties in their obviousness arguments before this court. *See, e.g.*, Alza Reply Br. at 13 (stating that "[t]he dispositive obviousness issue was whether colonic absorption of oxybutynin was reasonably expected in 1995") (emphasis added); Mylan Br. at 6 & n.2 (referring to evidence establishing "the clear expectation of one skilled in the art in 1995" and noting in a footnote that 1995 is "[t]he earliest possible date to which Alza asserts priority.") (emphasis added).

[\*\*20] As an initial matter, it is essential to recognize that, as we have explained above, under our non-rigid "motivation-suggesting-teaching" test, a suggestion to combine need not be found in the prior art. *See Cross Med. Prods.*, 424 F.3d at 1322 ("[T]he motivation to combine need not be found in prior art references, but equally can be found in the knowledge generally available to one of ordinary skill in the art . . . ."). Accordingly, where the testimony of an expert witness is relevant to determining the knowledge that a person of ordinary skill in the art would have possessed at a given time, this is one kind of evidence that is pertinent to our evaluation of a *prima facie* case of obviousness. We now turn to consider whether the relevant evidence, including the expert testimony and the prior art, when viewed as a whole supports the findings of the district court. We conclude that the findings of the district court were not clearly erroneous.

Mylan's expert, Dr. Amidon, testified that based on

its lipophilicity, he would "expect oxybutynin to be a highly permeable" compound that is "rapidly absorbed" along the length of the GI tract, including the colon. [\*\*21] Later, when challenged about the predictive value of lipophilicity, Dr. Amidon explained, "I would say there were some unknowns, but again lipophilic drugs would be well absorbed. That would be—that was the general understanding at the time."

Although Alza argues that two prior art references "decisively undercut Dr. Amidon's hindsight opinion," these references are in fact not inconsistent with the general principle that the extent of a drug's colonic absorption correlates with its lipophilicity. Indeed, the first reference, a 1990 publication in the *Journal of Pharmaceutical Sciences*, states that "[i]n general, the more lipophilic drugs were transported rapidly." P. Artursson, *Epithelial Transport of Drugs in Cell Culture. I: A Model for Studying the Passive Diffusion of Drugs over Intestinal Absorptive (Caco-2) Cells*. 79 J. Pharm. Sci. 476, 481 (1990). [\*\*22] Alza, however, cites this reference narrowly for its observation that a highly lipophilic analog of a particular drug did not follow the general rule that lipophilic drugs were transported more quickly. *Id.* Granted, the authors admit that "[t]he reason for this [deviation] is currently unknown," and they postulate [\*\*22] that it may be related to a physicochemical factor other than lipophilicity, namely steri hindrance. <sup>7</sup> *Id.* But the mere fact that the colonic absorption rate of a drug may be predicted most precisely by using "many factors," rather than "lipophilicity" alone, does not negate the general predictive utility of lipophilicity in estimating the extent of colonic absorption.

7 Dr. Chancellor, Alza's expert, likewise characterized colonic absorption as having been understood as being dependent on several physicochemical and physiological variables, of which lipophilicity was one.

The second prior art reference cited by Alza, *Absorption of Polar Drugs Following Caecal Instillation in Healthy Volunteers*, is similarly unavailing to it. Riley, et al., 6 Aliment. Pharmacol. Ther. 701, 705 (1992). Again, this reference teaches that while the correlation is not perfect, lipophilicity tended to suggest colonic absorption, stating that "[t]he relationship between the physical characteristics of a drug and its colonic absorption is not yet clear but studies in the rat suggest

that *lipophilic drugs are well absorbed along the length of the gastrointestinal tract* [\*\*23], whereas hydrophobic polar drugs are absorbed much less from the colon than from the small intestine." *Id.* (emphasis added).

Far from teaching away or detracting from the weight of Dr. Amidon's testimony, these prior art references, taken as a whole, are entirely consistent with the finding that in 1995 a person of ordinary skill in the art would have expected a general, albeit imperfect, correlation between a drug's lipophilicity and its colonic absorptivity. Accordingly, we cannot perceive clear error in the district court's factual findings that while colonic absorption was not *guaranteed*, the evidence, viewed as a whole, is clear and convincing that a person of ordinary skill in the art would nonetheless have perceived a reasonable likelihood of success and that she would have been motivated to combine prior art references to make the claimed invention.

Likewise, we find no error in the district court's consideration of secondary indicia of obviousness. We therefore affirm its legal conclusion of obviousness, finding the district court to have correctly held that Mylan met its burden of overcoming the presumption of validity that attaches to an issued patent.

#### D. [\*\*24] *Infringement*

The '355 patent specifically describes the rate of oxybutynin release from its "extended release" formulations, requiring that the time-course of *in vivo* oxybutynin release falls within certain boundaries. That is, at certain times, the cumulative amount of dissolved (released) drug must fall within certain ranges. To prove infringement, Alza bore the burden of proving, *inter alia*, that Mylan's accused generic formulation exhibited an *in vivo* release profile falling within the claimed ranges at the relevant times.

At trial, Alza presented no direct evidence of how quickly the accused product dissolved *in vivo*. *Alza II*, at 722. However, it did offer two kinds of indirect evidence as measures of the rate of *in vivo* release. *Id.* First, it presented evidence of the blood plasma concentration versus time profiles for both the accused ANDA formulation and Ditropan, an embodiment [\*\*1296] of the '355 patent. Second, it presented evidence of the rate of release not in the GI tract but in pieces of laboratory apparatus under certain experimental conditions,

so-called *in vitro dissolution*. The critical deficiency in the evidence presented by Alza was not [\*\*25] that it was "indirect" rather than "direct," but rather that it failed to credibly link these pieces of evidence with the relevant pharmacokinetic parameter--the rate of *in vivo* dissolution in the GI tract.

Thus, the district court explained that Alza had failed to demonstrate how evidence of the rate of dissolution of drug in the GI tract could be extracted from plots of plasma concentration versus time. The district court accepted Alza's simplifying assumption about oxybutynin rapidly being absorbed following dissolution such that the rates of *in vivo* dissolution parallel the rate of drug uptake into the blood. However, it found that only one expert, Dr. Amidon, had "endorsed Alza's subjective comparison of blood plasma levels with *in vivo* release rates." As for that one expert, moreover, he "rejected the very conclusion that Alza attributed to him."

Alza criticizes the district court for "fail[ing] to come to grips with the significance of the testimony" that Dr. Amidon "recanted . . . immediately after he made it." Specifically, Alza urges that notwithstanding the expert's recantation, we should nonetheless draw our independent conclusions from the "point of his [\*\*26] testimony" that release rates in blood and the appearance in the GI tract are essentially the same. We have considered Alza's arguments and find them to lack legal and factual coherency. Even if we were to presume to be experts and to apply the simplifying assumption that the drug is rapidly taken up into the bloodstream upon dissolution, it is not clear to us how to abstract from each plasma concentration versus time curve the rate of uptake into the bloodstream. This would require factoring out of the curve the effects, *inter alia*, of the elimination of drug from the bloodstream over the relevant 24 hour period. But this is not our province. Such evidence, if it exists, must have been presented at trial, or in its stead other evidence sufficient to persuade the trial court.

From what can be discerned, Dr. Amidon's immediately recanted statement appears to have been based on his comparison of the relative areas under the curves of plasma concentration versus time plots of both the accused ANDA formulation and Ditropan XL. Indeed, Alza reproduces in its appellate brief Dr. Amidon's testimony that the accused product has only 92 to 93 percent of the area under the curve of Ditropan [\*\*27] XL. This appears to have resulted in the drawing

of a line (referred to by the parties as "line A") on a plot of *in vitro* dissolution of both Ditropan XL and the accused ANDA formulation, wherein the rate of *in vitro* dissolution of Mylan's ANDA formulation has been adjusted according to that percentage. The basis for, and significance of, line A is simply not apparent from the record, and Alza fails to provide us with any persuasive line of argument as to how we should imbue line A with any relevant meaning. In short, we agree with Mylan that the plasma concentration versus time data fail to establish *in vivo* release rates for either Ditropan XL or the accused ANDA product.

The district court similarly found unpersuasive Alza's evidence that Ditropan XL and the accused ANDA product sometimes exhibited *in vitro* dissolution rates falling within the claims. The court cited testimony by Dr. Amidon explaining that these *in vitro* procedures are "not designed to reflect the *in vivo* dissolution process." This accords with the common sense notion that one cannot simply proclaim without proof that he has constructed an apparatus capable of mimicking pertinent [\*1297] environmental [\*28] variables of the GI tract (along the length of the tract, nonetheless). Indeed, the obtained *in vitro* dissolution rates vary widely with the choice of experimental parameters. We agree with the district court that Alza's evidence of *in vitro* dissolution rates is irrelevant absent evidence demonstrating that the *in vitro* system is a good model of actual *in vivo* behavior. On that point, Alza's evidence is severely lacking.

We therefore affirm the district court's finding of noninfringement. In so doing we explicitly reject Alza's suggestion that the district court erred in failing to specifically state that not only did it find Alza's plasma concentration data and its "*in vitro*" data to be inadequate in isolation, but that it had also found the data to be inadequate in combination. Even if we were to entertain the suggestion that the district court was in fact unfamiliar with the basic precept that it is the totality of the evidence that it must consider in making factual determinations, we would merely conclude that whereas here, if each of two pieces of evidence, assessed separately, is severely inadequate to support a proposition, when their probative values are [\*29] tallied, they still fall short. While it is possible to envision cases in which two pieces of evidence may create great probative value synergistically, this is not one of those cases.

\* \* \*

In conclusion, we affirm the judgment of the district court that the asserted claims of the '355 patent were invalid, and that notwithstanding, the patent was not infringed.

*AFFIRMED.*

Costs to Mylan.

LEXSEE 396 U.S. 57

ANDERSON'S-BLACK ROCK, INC. v. PAVEMENT SALVAGE CO., INC.

No. 45

SUPREME COURT OF THE UNITED STATES

396 U.S. 57; 90 S. Ct. 305; 24 L. Ed. 2d 258; 1969 U.S. LEXIS 3322; 163 U.S.P.Q. (BNA) 673

November 10, 1969, Argued  
December 8, 1969, Decided

**PRIOR HISTORY:** CERTIORARI TO THE  
UNITED STATES COURT OF APPEALS FOR THE  
FOURTH CIRCUIT.

**DISPOSITION:** 404 F.2d 450, reversed.

Headnote:[1]

The combination on one paving machine chassis of  
equipment for spreading and shaping asphalt, having  
been known in the prior art, is not a patentable invention.

[\*\*\*LEdHN2]

PATENTS §57

prior knowledge -- radiant burner --

Headnote:[2]

The use of a radiant-heat burner in working asphalt  
pavement, having been known in the prior art and  
disclosed in a previous patent, is not, by itself, patentable.

[\*\*\*LEdHN3]

PATENTS §40

combination -- obviousness --

Headnote:[3A][3B]

Even if the combination on one paving machine  
chassis of (1) a radiant burner for heating the exposed  
edge of a cold strip of pavement, and (2) equipment for  
spreading and shaping asphalt, has filled a long-felt want,  
has performed a useful function, and has enjoyed  
commercial success, such a combination is reasonably  
obvious to one with ordinary skill in the art and is thus  
not a patentable invention, where (1) the presence of the  
radiant burner in the same machine as the other  
equipment is not critical or essential to the burner's  
function in curing the problem of a cold joint between

Burger, Ch. J., did not participate.

**LAWYERS' EDITION HEADNOTES:**

[\*\*\*LEdHN1]

PATENTS §64

prior knowledge -- combination --

396 U.S. 57, \*, 90 S. Ct. 305, \*\*;  
 24 L. Ed. 2d 258, \*\*\*LEDHN3; 1969 U.S. LEXIS 3322

strips of pavement and hence adds nothing to the nature and quality of a radiant burner already patented; and (2) the combination does not result in an effect greater than the sum of the several effects taken separately.

[\*\*\*LEDHN4]

#### PATENTS §2

power of Congress --

Headnote:[4]

The patent standard is basically constitutional, Article I, 8, of the Constitution authorizing Congress to promote the progress of useful arts by allowing inventors monopolies for limited times; under this power, Congress may not enlarge the patent monopoly without regard to the innovation, advancement, or social benefit gained thereby, nor may Congress authorize the issuance of patents whose effects are to remove existent knowledge from the public domain or to restrict free access to materials already available.

[\*\*\*LEDHN5]

#### PATENTS §1

inherent requisites --

Headnote:[5]

Innovation, advancement, and things which add to the sum of useful knowledge are inherent requisites in a patent system which by constitutional command must promote the progress of useful arts, and this standard, expressed in the Constitution, may not be ignored.

[\*\*\*LEDHN6]

#### PATENTS §19.1

obviousness --

Headnote:[6]

In resolving the issue of obviousness for purposes of deciding whether a patent may be obtained, the scope and content of the prior art are to be determined, differences between the prior art and the claims at issue are to be ascertained, and the level of ordinary skill in the pertinent art is to be resolved; and strict observance of these requirements is necessary.

#### SYLLABUS

Respondent brought this action for infringement of a patent for "Means for Treating Bituminous Pavement." The patent sought to solve the problem of a cold joint on "blacktop" paving by combining known elements, a radiant-heat burner, a spreader, and a tamper and screed, on one chassis. The District Court, finding that all the inventor had done was to construct known elements in the prior art on a single chassis, held the patent invalid. The Court of Appeals reversed. *Held*: While the combination of old elements performed a useful and commercially successful function it added nothing to the nature and quality of the previously patented radiant burner, and to those skilled in the art the use of the old elements in combination was not an invention under the standard of 35 U.S.C. § 103. Pp. 59-63.

**COUNSEL:** Alan W. Borst argued the cause for petitioner. With him on the brief was Nathaniel L. Leek.

Walter J. Blenko, Jr., argued the cause and filed a brief for respondent.

**JUDGES:** Black, Douglas, Harlan, Brennan, Stewart, White, Marshall; Burger took no part in the decision of this case.

#### OPINION BY: DOUGLAS

#### OPINION

[\*57] [\*\*\*260] [\*\*306] MR. JUSTICE DOUGLAS delivered the opinion of the Court.

Respondent brought this action against petitioner for infringement of *United States Patent No. 3,055,280* covering "Means for Treating Bituminous Pavement." The patent was assigned to respondent by one Neville.

Bituminous concrete -- commonly called asphalt or "blacktop" -- is often laid in strips. The first strip laid usually has cooled by the time the adjoining strip is to be laid, creating what is known as a cold joint. [\*58] Because bituminous concrete is pliable and capable of being shaped only at temperatures of 250 degrees to 290 degrees F., the cold joint results in a poor bonding between the strips. Water and dirt enter between the strips, causing deterioration of the pavement.

Respondent's patent sought to solve the problem of

396 U.S. 57, \*58; 90 S. Ct. 305, \*\*306;  
24 L. Ed. 2d 258, \*\*\*260; 1969 U.S. LEXIS 3322

the cold joint by combining on one chassis (1) a radiant-heat burner for heating the exposed edge of the cold strip of pavement; (2) a spreader for placing bituminous material against that strip; and (3) a tamper and screed, for shaping the newly placed material to the desired contour and surface.

[\*\*\*LEdHR1] [1]The standard paving machine in use prior to respondent's claimed invention combined on one chassis the equipment for spreading and shaping the asphalt, and it is unquestioned that this combination alone does not result in a patentable invention. Petitioner's alleged infringement resulted from its placing of a radiant-heat burner on the front of a standard paving machine, thus allowing its machine to perform the same functions with the same basic elements as those described in respondent's patent.

[\*\*\*LEdHR2] [2]The use of a radiant-heat burner in working asphalt pavement dates back to a patent issued in 1905 to one Morcom, *United States Patent No. 799,014*. The value of such a heater lies in the fact that it softens the asphalt without burning the surface. The radiant-heat burner on respondent's claimed invention is essentially the same as that disclosed in a patent issued in 1956 to one Schwank, *United States Patent No. 2,775,294*. Thus the burner, by itself, is also not patentable.

The placement of the radiant-heat burner upon the side of a standard bituminous paver is the central feature of respondent's patent. The heater is used [\*\*307] in this way for continuous paving along a strip to prevent a cold joint, whereas previously radiant-heat burners had [\*\*59] been used merely for patching limited areas of asphalt. The operation of the heater is, however, in no way dependent on the operation of the other equipment on the paving machine. It is hung on the paver merely because that is a convenient place for it when heating the longitudinal joint of the pavement. A separate heater can also be used in conjunction with a standard paving machine to eliminate the cold joint, and in fact is so used for heating the transverse joints of the pavement.

Respondent claims that its patent involves a combination of prior art which produces the new and useful result of eliminating the cold joint. Its claim of unobviousness is based [\*\*\*261] largely on the testimony of two individuals who are knowledgeable in the field of asphalt paving, expressing their doubts to the inventor Neville that radiant heat would solve the

problem of cold joints. The District Court rejected respondent's claim of infringement, finding the patent invalid. The Court of Appeals, by a divided vote, reversed. For reasons that follow, we reverse the judgment of the Court of Appeals.

Each of the elements combined in the patent was known in the prior art. It is urged that the distinctive feature of the patent was the element of a radiant-heat burner. But it seems to be conceded that the burner, by itself, was not patentable. And so we reach the question whether the combination of the old elements created a valid combination patent.

[\*\*\*LEdHR3A] [3A]The District Court said: "All that plaintiff [respondent] has done is to construct four elements known in the prior art on one chassis." That is relevant to commercial success, not to invention. The experts tendered by respondent testified that they had been doubtful that radiant heat would solve the problem of [\*60] the cold joint.<sup>1</sup> But radiant heat was old in the art. The question of invention must turn on whether the combination supplied the key requirement. We conclude that the combination was reasonably obvious to one with ordinary skill in the art.

1. Mr. Francis C. Witkoski, an engineer, met the inventor, Charles Neville, between 1955 and 1960 while Witkoski was Director of Research for the Pennsylvania Department of Highways. Neville told Witkoski that he had invented a piece of equipment that would heat but not burn asphalt, and would thus eliminate cold joints. Witkoski replied that he did not believe that Neville had such a piece of equipment. Subsequently, Witkoski ordered from Neville some of the separate burner units and tested them. Thus the dialogue between Witkoski and Neville focused exclusively on the properties of the radiant-heat burner.

Mr. Leslie B. Crowley, also an engineer, met Neville prior to 1954. Crowley was at that time the Chief of the Pavements and Railroads Section, Director of Installations, Headquarters, United States Air Force. Neville explained the advantages of using an "infra-red" heater for the maintenance and repair of asphalt pavements. Crowley testified that his interest was insufficient at that time to motivate him to take any action with regard to the device because he did not

396 U.S. 57, \*60; 90 S. Ct. 305, \*\*307;  
24 L. Ed. 2d 258, \*\*LEdHR3A; 1969 U.S. LEXIS 3322

believe it would "do the job." Thus the Crowley-Neville discussion also focused entirely on the radiant-heat burner, and not on the combination of the burner with the other elements of a bituminous paver.

There is uncontested evidence that the presence of the radiant-heat burner in the same machine with the other elements is not critical or essential to the functioning of the radiant-heat burner in curing the problem of the cold joint. For it appears that a radiant-heat burner operating in a tandem fashion would work as well. The combination of putting the burner together with the other elements in one machine, though perhaps a matter of great convenience, did not produce a "new or different function." *Lincoln Co. v. Stewart-Warner Corp.*, 303 U.S. 545, 549, [\*\*308] within the test of validity of combination patents.

[\*61] A combination of elements may result in an effect greater than the sum of the several effects taken separately. No such synergistic result is argued here. It is, however, fervently argued that the combination filled a long felt want and has enjoyed commercial success. [\*\*\*262] But those matters "without invention will not make patentability." *A. & P. Tea Co. v. Supermarket Corp.*, 340 U.S. 147, 153.

[\*\*\*LEdHR4] [4] [\*\*\*LEdHR5] [5] The patent standard is basically constitutional, Article I, § 8, of the Constitution authorizing Congress "to promote the Progress of . . . useful Arts" by allowing inventors monopolies for limited times. We stated in *Graham v. John Deere Co.*, 383 U.S. 1, 6, that under that power Congress may not "enlarge the patent monopoly without regard to the innovation, advancement or social benefit gained thereby. Moreover, Congress may not authorize the issuance of patents whose effects are to remove existent knowledge from the public domain, or to restrict free access to materials already available. Innovation, advancement, and things which add to the sum of useful knowledge are inherent requisites in a patent system which by constitutional command must 'promote the Progress of . . . useful Arts.' This is the *standard* expressed in the Constitution and it may not be ignored."

In this case the question of patentability of the combination turns on the meaning of 35 U.S.C. § 103<sup>2</sup> which [\*62] the Court reviewed in the *Graham* case, *supra*, at 13-17. We said:

"We believe that this legislative history, as well as other sources, shows that the revision was not intended by Congress to change the general level of patentable invention. We conclude that the section was intended merely as a codification of judicial precedents embracing the *Hotchkiss*<sup>3</sup> condition, with congressional directions that inquiries into the obviousness of the subject matter sought to be patented are a prerequisite to patentability." *Id.* at 17.

2 35 U.S.C. § 103 provides:

"A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made."

3 *Hotchkiss v. Greenwood*, 11 How. 248.

[\*\*\*LEdHR6] [6] Obviousness, as an issue, is resolved as follows:

"Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved." *Ibid.*

We admonished that "strict observance" of those requirements is necessary. *Id.* at 18.

[\*\*\*LEdHR3B] [3B] We conclude that while the combination of old elements performed a useful function, <sup>4</sup> it added nothing to the nature and quality of the radiant-heat [\*\*309] burner already patented. We conclude further that [\*\*\*263] to those skilled in the art the use of the old elements in combination [\*63] was not an invention by the obvious-nonobvious standard. Use of the radiant-heat burner in this important field marked a successful venture. But as noted, more than that is needed for invention.

4 35 U.S.C. § 101 provides:

"Whoever invents or discovers any new and useful process, machine, manufacture, or

396 U.S. 57, \*63; 90 S. Ct. 305, \*\*309;  
24 L. Ed. 2d 258, \*\*\*263; 1969 U.S. LEXIS 3322

composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."

Absent here is the element "new." For as we have said, the combination patent added nothing to the inherent characteristics or function of the radiant-heat burner.

*Reversed.*

THE CHIEF JUSTICE took no part in the decision of this case.

#### REFERENCES

Am Jur, Patents (1st ed 19, 32, 57-60)

15 Am Jur Pl & Pr Forms, Patents, Form 15:827

US L Ed Digest, Patents 19.1, 40, 64

ALR Digests, Patents 9, 10

L Ed Index to Anno, Patents

ALR Quick Index, Patents

Federal Quick Index, Patents

LEXSEE 770 F.2D 1031

CABLE ELECTRIC PRODUCTS, INC., **Appellant** v. GENMARK, INC., a/k/a  
DIABLO PRODUCTS CORP., **Appellee**

No. 84-1412

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

*770 F.2d 1015; 1985 U.S. App. LEXIS 15064; 226 U.S.P.Q. (BNA) 881*

August 9, 1985

**PRIOR HISTORY:** [\*\*1]

Appealed from: U.S. District Court for the District of California.

**COUNSEL:**

Paul J. Sutton, of New York, New York, argued for Appellant. With him on the brief was Barry G. Magidoff and Anthony Amaral, Jr.

Alan H. MacPherson, Skjerven, Morrill, MacPherson, Franklin & Friel, of San Francisco, California, argued for Appellee. With him on the brief were Thomas J. Friel, Jr. and Daniel E. Weil.

**JUDGES:**

Bennett, Circuit Judge, Miller, Senior Circuit Judge, \* and Smith, Circuit Judge.

\* The Honorable Jack R. Miller assumed senior status effective June 6, 1985.

**OPINION BY:**

BENNETT

**OPINION:**

[\*1018] BENNETT, Circuit Judge.

**I. BACKGROUND**

This is an appeal from the United States District

Court for the Northern District of California n1 which through its grants of summary judgment favorable to defendant Genmark, Inc. (Genmark), on February 29, 1984, n2 and May 25, 1984, n3 rendered a final judgment in Civil Docket No. C-83-0897-WWS, an action for patent infringement, federal false designation of origin, state unfair competition, and state trademark infringement.

n1 The Honorable William W. Schwarzer, District Judge.

[\*\*2]

n2 582 F. Supp. 93, 223 U.S.P.Q. (BNA) 287.

n3 586 F. Supp. 1505, 223 U.S.P.Q. (BNA) 291.

The original complaint in this action was filed February 25, 1983, and accused Genmark of infringement of United States Patent No. 4,343,032 issued to Frederic W. Schwartz (the Schwartz patent) and owned by plaintiff Cable Electric Products, Inc. (Cable). The Schwartz patent relates to a photosensitive electric lamp able to turn itself on by degree as ambient light diminishes. As illustrated in Fig. 1 from the Schwartz patent, appearing below with unnecessary reference characters omitted, such a lamp includes a housing 10 which supports a light bulb 18 enclosed by a removable translucent shade 24. A lens 12 on the front of housing 10 permits ambient light to reach electrical circuitry and effect the operation described above. The device obtains

770 F.2d 1015, \*1018; 1985 U.S. App. LEXIS 15064, \*\*2;  
226 U.S.P.Q. (BNA) 881

power from a conventional electric wall receptacle through a pair of contact blades 14 at the rear of housing 10.

[SEE ILLUSTRATION IN ORIGINAL]

On October 11, 1983, Genmark filed a first motion for summary judgment. [\*\*3] The following day Cable moved for leave to amend its complaint to include, in addition to the patent count already joined, three others not based on any patent. The requested [\*1019] leave to amend was granted November 17, 1983. Subsequently, Genmark's first motion for summary judgment as to the patent count was granted. Thereafter, on April 24, 1984, Genmark made a second motion for summary judgment, this time as to the three counts added to the litigation by the amended complaint. The second motion was also granted, and the present appeal resulted.

We affirm the grant of summary judgment as to the patent infringement count, vacate the grant of summary judgment as to the nonpatent counts, and remand these for further appropriate deliberations.

The judgments will be reviewed below in the order granted. n4

n4 The discussion to follow can be summarized in outline form, which for the convenience of the reader is provided below:

I. BACKGROUND

II. THE PATENT COUNT

A. Summary Judgment

B. Harmful Error

C. Burdens of Proof

D. Prior Art

E. Hodgetts Declaration

F. Secondary Factors

1. Commercial Success
2. Product Copying

G. Disposition

III. THE NONPATENT COUNTS

A. Lanham Act

B. State Causes of Action

1. Choice of Law
2. Preemption
3. Disposition

IV. CONCLUSION

APPENDIX

[\*\*4]

II. THE PATENT COUNT

The district court dealt with the Genmark motion for summary judgment on the patent infringement count of the original complaint of Cable Electric in a Memorandum of Opinion and Order dated February 29, 1984 (the patent opinion). n5 There it stated, "The Court finds that, although defendant cannot establish that its device does not infringe plaintiff's patent, defendant does meet its burden of proof in establishing the obviousness of plaintiff's claimed invention under 35 U.S.C. § 103 without raising a genuine dispute of material fact." The Genmark motion was accordingly granted, and the Schwartz patent invalidated.

n5 *See supra* note 2.

Cable Electric attacks that judgment scattershot fashion with a laundry list of objections which fall into the two general areas of inquiry suggested by *Fed. R. Civ. P. 56(c)*, n6 namely, (1) the existence of genuine issues of material fact and (2) the entitlement of the movant to judgment as a matter of law. In the former [\*\*5] category, it is asserted that the obviousness standard used by the district court evidences a level of uncertainty which implies the existence of genuine issues of material fact, and that affidavits or deposition testimony submitted in opposition to the summary judgment motion raise contested issues of material fact with regard to the scope and content of the prior art, the differences between that art and the claims at issue, the commercial success of the product embodying those claims, and the copying of that product by Genmark as demonstrating nonobviousness. It

770 F.2d 1015, \*1019; 1985 U.S. App. LEXIS 15064, \*\*5;  
226 U.S.P.Q. (BNA) 881

is asserted that the evidence on these issues was not viewed in a light most favorable to Cable, the opponent of summary judgment.

n6 *Fed. R. Civ. P. 56(c)* states in relevant part:

"The judgment sought shall be rendered forthwith if the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law."

[\*\*6]

Regarding the law employed, Cable contends that the district court erred in that it shifted the burden of persuasion on invalidity, failed to determine that the art relied on to invalidate the Schwartz patent was more pertinent than that considered during prosecution, did not specifically indicate the combination of teachings that would yield the claimed invention, gave inadequate consideration to commercial success and copying as secondary indicia of nonobviousness, and applied an incorrect obviousness standard, which included, among other alleged [\*1020] deficiencies, a failure to consider the claimed invention as a whole.

We find these assertions individually and collectively to be without merit. The patent opinion of the district court is well reasoned and, in light of the record upon which it is based, adequate, accurate, and amply justified. The following discussion substantiates our conclusion.

#### A. Summary Judgment

Some comments on the use and appellate review of summary judgment are required to provide a frame of reference for a discussion of the record.

A number of objections by Cable are essentially complaints that the district court did not adequately [\*7] amplify its reasoning and the underlying factual inferences on which it relied in granting summary judgment. *Fed. R. Civ. P. 56(c)*, however, makes it clear that the circumstances in which a grant of summary judgment is proper are circumstances in which a district

court need not function as an arbiter among differing versions of every factual reality for which evidentiary support has been presented. Instead, the circumstances appropriate to summary judgment are those in which a district court is able to conclude that, with regard to any factual issues material to granting judgment as a matter of law, no genuine dispute exists. Thus, it manifests incorrect expectations to fault a district court in granting summary judgment for a failure to find particular facts. To engage in fact finding would be not only inappropriate, but would per se imply the impropriety of the grant. *See Lemelson v. TRW, Inc.*, 760 F.2d 1254, 1260-61, 225 U.S.P.Q. (BNA) 697, 700-01 (*Fed. Cir.* 1985).

Additionally, [\*8] although *Fed. R. Civ. P. 52(a)* provides that a "court shall find the facts specially and state separately its conclusions of law thereon," the rule contains the pertinent qualification that "findings of fact and conclusions of law are unnecessary on decisions of motions under Rules 12 or 56." *Accord Helena Rubinstein, Inc. v. Bau*, 433 F.2d 1021, 1024, 167 U.S.P.Q. (BNA) 711, 713 (*9th Cir.* 1970); *Fromberg, Inc. v. Gross Manufacturing Co.*, 328 F.2d 803, 806, 140 U.S.P.Q. (BNA) 641, 643 (*9th Cir.* 1964). An exception, which we do not consider to be applicable here, can be found in *Fed. R. Civ. P. 56* in the case of grants of partial summary judgment. n7 Assuredly, to know the reasoning a district court used in deciding to grant summary judgment facilitates the task of a reviewing court, and there does exist a risk in complicated cases of an unnecessary reversal if the logic that resulted in a grant of summary judgment cannot be discerned. *See Petersen Manufacturing Co. v. Central Purchasing, Inc.*, 740 F.2d 1541, 1546, 222 U.S.P.Q. (BNA) 562, 566 (*Fed. Cir.* 1984). Nevertheless, in light of the record before us and the patent opinion of [\*9] the district court, the issues in this case present no such degree of complexity as would preclude affirmance, due to any failure of the district court to make the basis of its holding clear.

n7 *Fed. R. Civ. P. 56(d)* states:

*"Case Not Fully Adjudicated on Motion.* If on motion under this rule judgment is not rendered upon the whole case or for all the relief asked and a trial is necessary, the court at the hearing of the motion, by examining the pleadings and the evidence before it and by interrogating counsel, shall if practicable ascertain what material facts

770 F.2d 1015, \*1020; 1985 U.S. App. LEXIS 15064, \*\*9;  
226 U.S.P.Q. (BNA) 881

exist without substantial controversy and what material facts are actually and in good faith controverted. It shall thereupon make an order specifying the facts that appear without substantial controversy, including the extent to which the amount of damages or other relief is not in controversy, and directing such further proceedings in the action as are just. Upon the trial of the action the facts so specified shall be deemed established, and the trial shall be conducted accordingly."

While the patent decision of the district court did not immediately dispose of "the whole case" brought by Cable, within 3 months a second order of summary judgment had decided the balance of the case. Consequently, no trial has proved necessary. As both summary judgment orders are before us in this appeal, and as the parties have not premised any arguments upon the fact that the initial, patent opinion was "not rendered upon the whole case," we view the exception of *Fed. R. Civ. P. 56(d)* as not applicable in any way here to increase the duty of the district court to find facts specially.

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Thus, the complaint of Cable as to the insufficiency of "the factual findings of the [\*1021] District Court on the scope and content of the prior art [or] . . . the differences between the prior art and the claims at issue" is unpersuasive for at least three reasons. First, the presence of findings would signal the possible existence of disputed issues of material fact, none of which we discern to exist. Second, there is no legal requirement that the rationale behind a nonpartial grant of summary judgment, including a recitation of undisputed factual inferences and applications of legal principles, be made explicit. The only requirement in this regard is pragmatic, with an eye toward judicial economy and communication with the litigants. Finally, in this instance, the premise underlying the argument is simply incorrect. Contrary to the hyperbole of Cable, the patent opinion of the district court evidences that it considered and, in view of the straightforward nature of this case, adequately discussed the issues involved.

On this basis, we also dispose of the charge by Cable [\*\*11] that the district court "failed to make a factual

determination as to whether any of these [prior art patent] references were or were not more pertinent than the art considered by the Patent and Trademark Office during the prosecution of the patent-in-suit." Cable cites *Jones v. Hardy*, 727 F.2d 1524, 1529, 220 U.S.P.Q. (BNA) 1021, 1025 (Fed. Cir. 1984), as condemning the omission of such a determination. Nevertheless, in *Jones* the appeal was from a judgment rendered after a 2-day trial, rather than one from summary judgment, and the failure of the lower court opinion to contain a *factual* determination as to pertinency was but one of many, more major flaws in the obviousness analysis cited by this court in reversing a conclusion of invalidity. The analysis faulted in *Jones* included, for example, a denial of the "statutory presumption of validity and an impermissible burden-shifting." *id.*, which, as will be discussed below, did not occur here. Cf. *King Instrument Corp. v. Otari Corp.*, 767 F.2d 853, , 226 U.S.P.Q. (BNA) 402, 404 (Fed. Cir. 1985) (referring to the failings in the *Jones* analysis as a "parade of horrors"). [\*\*12] A determination on pertinency may in some cases afford insight into the reasoning of the factfinder, but it is not strictly a requirement under *Graham v. John Deere Co.*, 383 U.S. 1, 145 U.S.P.Q. (BNA) 459, 15 L.Ed.2d 545, 86 S.Ct. 684 (1966), for a proper obviousness analysis.

Review of the grant of summary judgment at issue then first requires review of the evidence relevant to the factual inquiries of *Graham*, including evidence relevant to the secondary considerations, in order to determine whether any genuine issue exists as to facts material to reaching a conclusion on obviousness. *Cooper v. Ford Motor Co.*, 748 F.2d 677, 679, 223 U.S.P.Q. (BNA) 1286, 1287-88 (Fed. Cir. 1984). If not, and if viewing that evidence in a light most favorable to the nonmovant and drawing in favor thereof all inferences as are reasonable, the moving party is entitled to judgment as a matter of law, the grant of summary judgment will be affirmed. *Id.* at 679, 223 U.S.P.Q. at 1288 [\*\*13]

#### B. Harmful Error

In such analysis as Cable is willing to acknowledge was included by the district court in its patent opinion, several errors are alleged. Nevertheless, as obviousness under 35 U.S.C. § 103 (1982) is a conclusion of law subject to our full and independent review, *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 1344, 220 U.S.P.Q. (BNA) 777, 782 (Fed. Cir.) (in banc, cert. denied, 469 U.S. 830, 105 S.Ct. 116, 225 U.S.P.Q. (BNA) 232, 83 L.

770 F.2d 1015, \*1021; 1985 U.S. App. LEXIS 15064, \*\*13;  
226 U.S.P.Q. (BNA) 881

*Ed. 2d 60 (1984)*, reversal in this instance would require more than a mere demonstration of error in analysis. Even assuming that such errors were committed, Cable must demonstrate that if the errors were corrected, the application of the law to the facts present would produce a different result. *Union Carbide Corp. v. American Can Co.*, 724 F.2d 1567, 1573, 220 U.S.P.Q. (BNA) 584, 589 (Fed. Cir. 1984). In short, such errors as may be demonstrated must have further been harmful. See 28 U.S.C. [\*1022] § 2111. n8 *Accord* [\*\*14] *Richdel, Inc. v. Sunspool Corp.*, 714 F.2d 1573, 1580, 219 U.S.P.Q. (BNA) 8, 12 (Fed. Cir. 1983).

n8 28 U.S.C. § 2111 (1982) reads as follows:

*"Harmless error.* On the hearing of any appeal or writ of certiorari in any case, the court shall give judgment after an examination of the record without regard to errors or defects which do not affect the substantial rights of the parties."

#### C. Burdens of Proof

The burdens of demonstrating the absence of genuine issues of material fact and the entitlement to judgment as a matter of law is upon the summary judgment movant, Germark. *Cooper*, 748 F.2d at 679, 223 U.S.P.Q. at 1288. In this instance, as Germark is also the party asserting the invalidity of a United States patent, the burden of demonstrating an entitlement [\*\*15] to judgment as a matter of law includes the burden of overcoming the presumption of patent validity found in 35 U.S.C. § 282. n9 Cable claims that, despite explicit mention by the district court, the presumption of validity was not observed. The presumption of section 282 is "a procedural device which places on a party asserting invalidity the initial burden of going forward to establish a prima facie case on that issue." *Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881, 885, 221 U.S.P.Q. (BNA) 1025, 1028 (Fed. Cir. 1984). While "the burden of persuasion on the issue of invalidity also rests throughout the litigation with the party asserting invalidity," *id.*, if evidence is presented establishing a prima facie case of invalidity, the opponent of invalidity must come forward with evidence to counter the prima facie challenge to the presumption of section 282. This requirement is in no way contrary to the procedural role of the presumption of validity. Nor does it in substance shift the burden of persuasion on the issue. "In the end, the [\*\*16] question

is whether all the evidence establishes that the validity challenger so carried his burden as to have persuaded the decisionmaker that the patent can no longer be accepted as valid." *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1534, 218 U.S.P.Q. 871, 876 (Fed. Cir. 1983).

n9 35 U.S.C. § 282 (1982) contains the following first paragraph:

*"Presumption of validity; defenses*

"A patent shall be presumed valid. Each claim of a patent (whether in independent, dependent, or multiple dependent form) shall be presumed valid independently of the validity of other claims; dependent or multiple dependent claims shall be presumed valid even though dependent upon an invalid claim. The burden of establishing invalidity of a patent or any claim thereof shall rest on the party asserting such invalidity."

Likewise, [\*\*17] on a motion for summary judgment, the burden is upon the movant in support thereof to demonstrate an absence of genuine issues of material fact and then the entitlement to judgment at law. *Fed. R. Civ. P. 56(c)*. n10 If a showing is made that would entitle the movant to judgment unless contradicted, then *Fed. R. Civ. P. 56(e)* n11 states that the nonmovant has the burden to show that such a contradiction is possible; it cannot rest upon its allegations and pleadings. *First National Bank v. First Bank Stock Co.*, 306 F.2d 937, 943 (9th Cir. 1962). Indeed, this "shift of burden and the duty to come forward with possible contradiction of proof is the essence of *Fed. R. Civ. P. 56*." *DeLong Corp. v. Raymond International, Inc.*, 622 F.2d 1135, 1144, 206 U.S.P.Q. (BNA) 97, 104 (3d Cir. 1980) (cited and quoted in part in *D. L. Auld Co. v. Chroma Graphics Corp.*, 714 F.2d 1144, 1150, 219 U.S.P.Q. (BNA) 13, 17-18 (Fed. Cir. 1983)). Here, once Germark had established its prima facie case for summary judgment, which would have included a prima facie case for overcoming the presumption of validity, it fell upon Cable to submit evidence setting [\*\*18] forth specific facts raising [\*1023] a genuine issue for trial. *First National Bank v. Cities Service Co.*, 391 U.S. 253, 289, 20 L.Ed.2d 569, 85 S.Ct. 1575, *reheg'd denied*, 393 U.S. 901, 59 S.Ct. 63, 21 L.Ed.2d 188 (1968). This Cable clearly understood

when it submitted, in opposition to the summary judgment motion of Genmark, deposition testimony and various declarations which it contended raised genuine issues of material fact relative to an obviousness analysis under *Graham*. In commenting on the effectiveness of one of these declarations in presenting evidence of factual issues requiring trial, the district court said "plaintiff [Cable] seeks to avoid summary judgment by introducing the declaration of an expert that, it claims, raises genuine issues of material fact." 582 F. Supp. at 97, 223 U.S.P.Q. at 291. It is now contended that the "avoid summary judgment" phrase of this statement demonstrates that the district court improperly shifted to Cable, the patentee, the burden of persuasion on the issue of invalidity. We disagree.

n10 *See supra* note 6.

[\*\*19]

n11 *Fed. R. Civ. P. 56(e)* states in relevant part:

"When a motion for summary judgment is made and supported as provided in this rule, an adverse party may not rest upon the mere allegations or denials of his pleading, but his response, by affidavits or as otherwise provided in this rule, must set forth specific facts showing that there is a genuine issue for trial. If he does not so respond, summary judgment, if appropriate, shall be entered against him."

For reasons to be discussed below, and with which we concur, the district court deemed the affidavits submitted by Cable to have been inadequate to show any genuinely contested issues of material fact. Thus, Cable failed in the duty imposed upon it by *Fed. R. Civ. P. 56(e)* to rebut the *prima facie* case for summary judgment by showing "that there is a genuine [factual] issue for trial." Contrary to the argument of Cable, this duty is distinct from that of "requiring that the evidence 'persuade' the court of patentability," which was condemned [\*\*20] in *Jones v. Hardy*, 727 F.2d at 1528, 220 U.S.P.Q. at 1025. The avoidance of summary judgment as to patent invalidity does not represent a shift of the burden of going forward to establish a case for invalidity or the burden of persuasion on the issue of

invalidity. Under section 282 these burdens were imposed on Genmark, and we have not been given the impression that the district court shifted them to Cable. The stray and inconsequential quotations proffered in this regard from the summary judgment hearing add nothing to the meritless claim that the presumption of validity was not observed.

#### D. Prior Art

The district court opinion invalidating the Schwartz patent mentions a number of prior art patent references. Among these, U.S. Patent No. 3,965,353 to Smallegan (the Smallegan patent) discloses a night light controlled by a photosensitive switch and operated from an electric wall receptacle. It is undisputed that this reference alone teaches all of the limitations in the claims of the Schwartz patent, save those pertaining to what is termed in claim 1 thereof n12 "shade of predetermined shape and appearance." In this regard, however, the Smallegan patent [\*\*21] does contain a specific suggestion for providing some sort of shade about the bulb of the device to reduce the effect of the bulb on the photosensitive control, and other references discussed below exhibit the shade details recited in the patent in suit.

n12 Claim 1, the sole independent claim of the three claims in the Schwartz patent, is included by way of illustration in the Appendix to this opinion.

For example, U.S. Patent No. 3,694,607 to Fontana and U.S. Patent No. Des. 205,371 to Mellyn, from which Fig. 3 is included here, disclose bottom-mounted night light shades which "frictionally engage and disengage in a snap-on manner . . . said [lamp] housing in a position . . . facilitating repeated replacement of said bulb," as is recited in claim 1 of the Schwartz patent.

[SEE ILLUSTRATION IN ORIGINAL]

Additionally, U.S. Patents Nos. Des. 207,500 and Des. 208,939, both also to Mellyn, show such shades having "front and side [\*1024] wall portions." Figs. 1 and 2 of the latter patent [\*\*22] are included below and depict a shade fully described by the following limitation from claim 1 of the patent in suit:

770 F.2d 1015, \*1024; 1985 U.S. App. LEXIS 15064, \*\*22;  
226 U.S.P.Q. (BNA) 881

Said front wall portion [has] a generally planar surface extending between generally rectangular edges including longer vertically extending edges and relatively shorter horizontally extending edges, said side wall portions extending in a diverging manner generally symmetrically at a predetermined angle greater than 90 degrees away from said front wall portion toward a rearward plane of said [lamp] housing. . . ."

All of these references are from the electric night light art, the same as that of the patent in suit and of the Smallegan patent. Based on the explicit suggestions for a shade contained in the latter, teachings of these references could have been combined to produce a device meeting all the limitations of claim 1 of Schwartz except for having "a generally polygonal-shaped pattern extending over substantially the entire front wall portion" of the shade.

This feature, however, can be found in the following patents among those mentioned by the district court as examples of such a teaching:

[SEE ILLUSTRATION IN ORIGINAL]

U.S. Patent No.	Patentee
Des. 127,892	Ohm
3,549,879	Meyer
3,265,887	Wince
2,978,575	Cohen

[\*\*23]

None of these deal with shades for night lights specifically, but rather with shades for overhead lighting fixtures. Cable argues that these would use fluorescent light bulbs in contrast to the incandescent-type employed with the night light of the Schwartz patent. The declaration of 33-year Cable employee, Harry Hodgetts, head of the company's design engineering department (the Hodgetts declaration), attempts to puff up the difference between the two types of light bulbs as presenting "entirely different light diffusing problems," but fails absolutely to elaborate the nature of the purported differences. Such unsupported conclusional statements are not helpful in affidavits used to "avoid summary judgment."

The references demonstrate that polygonal patterning on light shades was old in the lighting art, even if not in the narrow field of night lights. Each reference addresses a problem confronted by the Schwartz patent, namely, the diffusion of light from an electric bulb, be it incandescent or fluorescent, through a translucent [\*1025] shade. In evaluating obviousness, the [\*24] hypothetical person

of ordinary skill in the pertinent art is presumed to have the "ability to select and utilize knowledge from other arts reasonably pertinent to [the] particular problem" to which the claimed invention is directed. *In re Antle*, 58 C.C.P.A. 1382, 444 F.2d 1168, 1171-72, 170 U.S.P.Q. (BNA) 285, 287-88 (1971); see, e.g., *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1460, 221 U.S.P.Q. (BNA) 481, 487 (Fed. Cir. 1984). Assuming arguendo that these four references are not strictly within the field of art represented by Schwartz, they are easily within a field analogous thereto, and their teachings are properly combinable with the earlier references discussed above. See *Union Carbide Corp. v. American Can Co.*, 724 F.2d 1567, 1572, 220 U.S.P.Q. (BNA) 584, 588 (Fed. Cir. 1984) (quoting *In re Wood*, 599 F.2d 1032, 1036, 202 U.S.P.Q. (BNA) 171, 174 (CCPA 1979)).

Cable faults the district court for failing to make determinations as to how teachings of the references could be combined to produce the patented invention. Nevertheless, the straight-forward quality of the [\*25] invention and art involved make the required combination quite apparent. The district court pointed

770 F.2d 1015, \*1025; 1985 U.S. App. LEXIS 15064, \*\*25;  
226 U.S.P.Q. (BNA) 881

out features in each reference; presumably it was these that were to be joined. As to most teachings, several references were cited without delineating a single one of the group for combination with references showing other features. The district court did so apparently to demonstrate the widespread knowledge in the lighting art of each feature involved. As no serious ambiguity resulted, we observe no error in this.

Further, the suggestion to modify the art to produce the claimed invention need not be expressly stated in one or all of the references used to show obviousness. "Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 U.S.P.Q. (BNA) 871, 881 (CCPA 1981) (and cases cited therein); *Leinoff v. Louis Milona & Sons, Inc.*, 726 F.2d 734, 739, 220 U.S.P.Q. (BNA) 845, 848-49 (Fed. Cir. 1984). The district court in invalidating the Schwartz [\*\*26] patent relied exclusively and correctly on "knowledge clearly present in the prior art." *In re Sernaker*, 702 F.2d 959, 995, 217 U.S.P.Q. (BNA) 1, 6 (Fed. Cir. 1983). In this respect it is to be sustained.

#### E. Hodgetts Declaration

Cable claims that the Hodgetts declaration, if viewed "in a light most favorable" to Cable, raises genuine issues of material fact in relation to the inquiries required by *Graham* dealing with scope and content of the prior art and the differences between that art and the claims at issue. With respect to the references discussed above, the declaration adds little, if anything, not already in the record. While attempting to highlight differences in the teachings of the references and the claimed invention, it largely summarizes their contents and is thus duplicative in a manner which fails to demonstrate any genuine dispute as to issues of material fact and is not helpful in resolving patentability problems. "What we do find helpful is facts of which we would not otherwise be aware." *In re Vamco Machine & Tool, Inc.*, 752 F.2d 1564, 1576, 224 U.S.P.Q. (BNA) 617, 624 (Fed. Cir. 1985). [\*\*27]

The declaration states the opinion that "the patented invention of the Schwartz patent . . . [would] not [have been] obvious to one of ordinary skill in the night light art" from the teachings of the references discussed. Obviousness, however, is a question of law.

Opinion testimony by experts concluding that an invention would or would not have been obvious may influence the court's decision, but conflicting opinions on a legal issue *vel non* raise no issue of contested fact. Nor is the court's conclusion on obviousness an adverse inference of fact.

*Petersen Manufacturing Co. v. Central Purchasing, Inc.*, 740 F.2d 1541, 1548, 222 U.S.P.Q. (BNA) 562, 567 (Fed. Cir. 1984) (citations omitted).

[\*1026] We reject the contention that the Hodgetts declaration raised contested issues of fact. At most, the declaration offered an *interpretation* of undisputed factual evidence, but did not set forth specific conflicting facts that showed a genuine issue requiring trial.

#### F. Secondary Factors

[\*\*28] In making a determination on obviousness under 35 U.S.C. § 103, *Graham v. John Deere Co.*, 383 U.S. at 17, 148 U.S.P.Q. at 467, sets forth, as providing "background," "several basic factual inquiries," including the content of the prior art, the difference between that art and the claimed subject matter, and the level of ordinary skill in the subject art. In addition, it is suggested that certain "secondary considerations" which "give light to the circumstances surrounding the origin of the [patented] subject matter" *may* have relevancy as "indicia of obviousness or nonobviousness." *Id.* at 17-18, 148 U.S.P.Q. at 467. The opinions of this court have suggested that evidence on these secondary considerations is to be taken into account *always*, "not just when the decisionmaker remains in doubt after reviewing the art." *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1539, 218 U.S.P.Q. (BNA) 871, 879 (Fed. Cir. 1983). See *Simmons Fastener Corp. v. Illinois Tool Works, Inc.*, 739 F.2d 1573, 1575, 222 U.S.P.Q. (BNA) 744, 746 (Fed. Cir. 1984), [\*29] cert. denied, 471 U.S. 1065, 105 S. Ct. 2135, 85 L. Ed. 2d 496 (1983); *Radio Steel & Manufacturing Co. v. MTD Products, Inc.*, 731 F.2d 840, 846, 221 U.S.P.Q. (BNA) 657, 662 (Fed. Cir.), cert. denied, 469 U.S. 831, 105 S. Ct. 119, 83 L. Ed. 2d 62 (1984); *Jones v. Hardy*, 727 F.2d at 1530, 220 U.S.P.Q. at 1027; *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1549, 220 U.S.P.Q. (BNA) 193, 197 (Fed. Cir. 1983).

Nevertheless, a "nexus between the merits of the claimed invention and the evidence of secondary considerations is required in order for the evidence to be given substantial significance in an obviousness decision." *Simmons Fastener*, 739 F.2d at 1573, 222 U.S.P.Q. at 746; *Stratoflex*, 713 F.2d at 1539, 218 U.S.P.Q. at 879. Thus, the weight to be accorded evidence on secondary considerations is to be carefully appraised in relation to the facts of the actual case in which it is offered. *See EWP Corp. v. Reliance Universal, Inc.*, 755 F.2d 898, 908, 225 U.S.P.Q. (BNA) 20, 26 (Fed. Cir. 1985); *In re Vamco Machine & Tool, Inc.*, 752 F.2d 1564, 1574-77, 224 U.S.P.Q. 617, 623-25 (Fed. Cir. 1985); [\*\*30] *see also* Address by D. Chisum, AIPLA Annual Meeting (October 26, 1984), reprinted in 1984 AIPLA Bull. 618, 620 ("secondary not because they are secondary in importance [but] . . . because they are relevant through a process of inference to the ultimate technical issue of nonobviousness [and being] . . . relevant through a chain of inference, their force may be weakened for a variety of reasons").

Cable claims that a trial is required due to the existence of contested issues of material fact regarding (1) the commercial success of the Cable device embodying the claims of the Schwartz patent and (2) the copying of that device by Genmark.

#### 1. Commercial Success.

Cable relies on the declaration of its chief financial officer, George Lema, executed October 31, 1982 (the Lema declaration). Relevant to this issue, it states only the following:

Plaintiff [Cable] began manufacturing its night light in 1978. Since the introduction of that night light, over 5 million units have been sold. Profits of not less than fifty (\$.50) cents per unit have been realized by plaintiff. Plaintiff's night light has been distributed nationwide in major department store chains [\*\*31] and local hardware outlets.

Genmark has not disputed this statement, so it is to be accepted for what it shows. *Union Carbide*, 724 F.2d 1567 at , 220 U.S.P.Q. at 591.

Nevertheless, what it shows in relation to commercial success is fairly minimal. Without further economic evidence, for example, it would be improper to infer that the reported sales represent a substantial share of any definable market or whether [\*\*1027] the profitability per unit is anything out of the ordinary in the industry involved. This type of information might bolster the existence in fact of any commercial success which may be demonstrated by the Lema declaration, but even assuming commercial success were clearly shown, Cable would face an additional hurdle before the Lema declaration could prove pertinent to nonobviousness.

As the district court correctly pointed out in declining to give weight to the Lema declaration on the issue of commercial success as an indicator of nonobviousness, this court in *Stratoflex, Inc. v. Aerquip Corp.*, 713 F.2d 1530, 218 U.S.P.Q. (BNA) 871 (Fed. Cir. 1983), has unequivocally stated that [\*\*32] for commercial success of a product embodying a claimed invention to have true relevance to the issue of nonobviousness, that success must be shown to have in some way been due to the nature of the claimed invention, as opposed to other economic and commercial factors unrelated to the technical quality of the patented subject matter. Thus, a "nexus is required between the merits of the claimed invention and the evidence offered, if that evidence is to be given substantial weight enroute to [a] conclusion on the obviousness issue." *Id.* at 1539, 218 U.S.P.Q. at 879. *Accord EWP Corp. v. Reliance Universal, Inc.*, 755 F.2d 898, 908, 225 U.S.P.Q. (BNA) 20, 26 (Fed. Cir. 1985) ("a 'secondary consideration' must be carefully appraised as to its evidentiary value"); *Simmons Fastener Corp. v. Illinois Tool Works, Inc.*, 739 F.2d 1573, 1575, 222 U.S.P.Q. (BNA) 744, 746 (Fed. Cir. 1984), cert. denied, 471 U.S. 1065, 105 S. Ct. 2138, 85 L. Ed. 2d 494 (1985); *In re Vamco Machine & Tool, Inc.*, 752 F.2d 1564, 1577, 224 U.S.P.Q. (BNA) 617, 625 (Fed. Cir. 1985); [\*\*33] *see also* *Ruben Condenser Co. v. Aerovox Corp.*, 77 F.2d 266, 268 (2d Cir.), cert. denied, 296 U.S. 623, 56 S. Ct. 145, 80 L. Ed. 443 (1935) (where Judge Learned Hand stated, "While it is always the safest course to test a putative invention by what went before and what came after, it is easy to be misled. Nothing is less reliable than uncritically to accept its welcome by the art, even though it displace[s] what went before"). Viewed in a light most favorable to Cable, from the Lema declaration an inference of some commercial success might be deduced, but as to establishing any "nexus" between that hypothetical success and "the merits of the

claimed invention," no evidence was submitted in the declaration or elsewhere that could justify giving weight to the declaration in reaching a conclusion on obviousness. After considering the Lema declaration the district court correctly determined to accord it no weight.

## 2. Product Copying.

Cable alleges that Genmark copied the Cable night light in designing the accused infringing device and that this alleged copying is evidence of nonobviousness of the Schwartz patent. The evidence in support [\*\*34] of the charge of copying in designing the Genmark product is ambiguous, even viewed in a light favorable to Cable. Deposition testimony of Thomas E. Corder, president of Diablo Technologies, Inc., apparently a successor of Diablo Products Corp., was offered on this point, but Genmark's own characterization of the implication of this evidence was merely that it showed that Corder "had access to and analyzed the appearance of plaintiff's night light during the period he was developing the accused Diablo [later Genmark] night light." Access to, and analysis of, other products in the market is hardly rare, even in the design stages of competing devices. Access in combination with similarity can create a strong inference of copying, but here Cable, as noted by the district court, failed to submit into evidence a sample of its own device for comparative purposes in evaluating the extent of similarity.

The Lema declaration states that "defendant [Genmark] deliberately copied plaintiff's night light when it designed its own night light," but only on information and belief, which under *Fed. R. Civ. P. 56(e)* is an inadequate basis upon which to base affidavits supporting or opposing [\*\*35] summary [\*1028] judgment. n13 Thus, in this instance, product copying at the design stage would be a strained inference.

n13 *Fed. R. Civ. P. 56(e)* states in relevant part:

"Supporting and opposing affidavits shall be made on personal knowledge, shall set forth such facts as would be admissible in evidence, and shall show affirmatively that the affiant is competent to testify to the matters stated therein. Sworn or certified copies of all papers or parts thereof referred to in an affidavit shall be attached thereto or served therewith. The court may permit

affidavits to be supplemented or opposed by depositions, answers to interrogatories, or further affidavits."

Further, in pressing the relevance to nonobviousness of purported copying by Genmark, "as is often the case . . . [Cable] failed to distinguish infringement by a defendant from that of numerous other competitors." Note, *Subtests of "Nonobviousness": [\*\*36] A Nontechnical Approach to Patent Validity*, 112 U. Pa. L. Rev. 1169, 1179 n.51 (1964) (cited in *Graham v. John Deere Co.*, 383 U.S. 1, 18, 148 U.S.P.Q. (BNA) 459, 467, 15 L. Ed. 2d 545, 86 S. Ct. 684 (1966), as relevant to the decision of the Supreme Court to include secondary indicia in the prescribed obviousness determination). It is our conclusion that more than the mere fact of copying by an accused infringer is needed to make that action significant to a determination of the obviousness issue. *Accord Vandenberg v. Dairy Equipment Co.*, 740 F.2d 1560, 1567, 224 U.S.P.Q. (BNA) 195, 199 (Fed. Cir. 1984), where copying of a patented device, despite the failure of protracted efforts by the copyist to design a similar device, was found to be an admission of the mechanical superiority of the patented version, but "not strong evidence of nonobviousness." n14

n14 That is not to say that copying is always irrelevant in the context of other evidence of nonobviousness. See *Jones v. Hardy*, 727 F.2d 1524, 1531, 220 U.S.P.Q. (BNA) 1021, 1026-27 (Fed. Cir. 1984); *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1540, 1541, 218 U.S.P.Q. (BNA) 871, 880 (Fed. Cir. 1983).

[\*\*37]

Rather than supporting a conclusion of obviousness, copying could have occurred out of a general lack of concern for patent property, in which case it weighs neither for nor against the nonobviousness of a specific patent. It may have occurred out of contempt for the specific patent in question, only arguably demonstrating obviousness, or for the ability or willingness of the patentee financially or otherwise to enforce the patent right, which would call for deeper inquiry. Even widespread copying could weigh toward opposite conclusions, depending on the attitudes existing toward patent property and the accepted practices in the industry in question. It is simplistic to assert that copying per se

should bolster the validity of a patent.

We do not concur in the reasoning evidenced by the statement of the district court that "it is just as likely that the similarity (assuming it exists) is more attributable to the simple obviousness of plaintiff's design rather than to defendant's deliberate mimicry." 582 F. Supp. at 97, 223 U.S.P.Q. at 290. The record simply offers nothing in this regard, and the speculation involved is unwarranted. Nevertheless, in view of Cable's [\*#38] poor showing as to copying and in view of the barrenness of the record on the "nexus" between any copying arguably shown and the nonobviousness of the claimed invention, it would have been improper to give the alleged copying by Genmark much weight in the obviousness analysis. Thus, the district court treated this issue appropriately, and its comment above as to the reason for copying, if any exists, is but harmless error.

#### *G. Disposition*

Based on a review of the record as discussed above, it is our conclusion that the patent portion of this case was properly resolved by a grant of summary judgment and that the Schwartz patent is invalid as being directed to obvious subject matter. We can discern no such genuinely disputed questions of fact material to such a judgment as would warrant a trial.

The art involved is easily grasped. The difference between the teaching of each reference and the claimed subject matter is clear, as is how those teachings are to be combined to yield the subject invention. [\*1029] No issue has been raised about the level of skill employed in analysis, that of an ordinary layman of average intelligence and one in this case most favorable to [\*#39] Cable Electric. Cf. *Chore-Time Equipment, Inc. v. Cumberland*, 713 F.2d 774, 779 n.2, 218 U.S.P.Q. (BNA) 673, 676 n.2 (Fed. Cir. 1983). Secondary considerations for the reasons stated above have been given proper weight.

Cable raises objection to the statement of the district court that it "has no difficulty finding it more likely than not that . . . a shade of the type plaintiff claims . . . [is] an obvious solution" to the problem confronted by plaintiff. Naturally, a determination on the issue of obviousness is no "finding"; it is question of law. Nevertheless, this slip and the concomitant use of the phrase, "more likely than not," are but harmless rhetorical error. Elsewhere throughout the patent opinion the district court shows a

good understanding of the nature of and analysis associated with reaching a conclusion on obviousness. Nor do we agree with Cable that the district court either was "confused as to what the claimed invention in suit was" or failed to consider that invention as a whole.

#### III. THE NONPATENT COUNTS

The district court granted the Genmark motion for summary judgment as to the nonpatent counts of Cable's amended complaint in a [\*#40] second Memorandum of Opinion and Order dated May 25, 1984 (the second opinion). n15 As the district court ultimately exercised its jurisdiction over the patent count discussed above under the patent provision of 28 U.S.C. § 1338(a), n16 we have jurisdiction also to review the appeal of the remaining nonpatent counts under 28 U.S.C. § 1295(a). n17 *Bandag, Inc. v. Al Bolser's Tire Stores, Inc.*, 750 F.2d 903, 907-09, 223 U.S.P.Q. (BNA) 982, 984-85 (Fed. Cir. 1984). See also *Atari, Inc. v. JS & A Group, Inc.*, 747 F.2d 1422, 223 U.S.P.Q. (BNA) 1074 (Fed. Cir. 1984) (in banc).

n15 See *supra* note 3.

n16 28 U.S.C. § 1338(a) (1982) states: "Patents, plant variety protection, copyrights, trademarks, and unfair competition

"(a) The district courts shall have original jurisdiction of any civil action arising under any Act of Congress relating to patents, plant variety protection, copyrights and trademarks. Such jurisdiction shall be exclusive of the courts of the states in patent, plant variety protection and copyright cases."

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n17 28 U.S.C. § 1295(a)(1) (1982) states: "Jurisdiction of the United States Court of Appeals for the Federal Circuit

"(a) The United States Court of Appeals for the Federal Circuit shall have exclusive jurisdiction --

"(1) of an appeal from a final decision of a district court of the United States, the United States

770 F.2d 1015, \*1029; 1985 U.S. App. LEXIS 15064, \*\*41;  
226 U.S.P.Q. (BNA) 881

District Court of the District of the Canal Zone, the District Court of Guam, the District Court of the Virgin Islands, or the District Court for the Northern Mariana Islands, if the jurisdiction of that court was based, in whole or in part, on section 1338 of this title, except that a case involving a claim arising under any Act of Congress relating to copyrights or trademarks and no other claims under section 1338(a) shall be governed by sections 1291, 1292, and 1294 of this title[.]".

Nevertheless, in deciding these nonpatent matters we do so "in the light of the problems faced by the district court from which each count originated, including [\*42] the law there applicable," *Bandag*, 750 F.2d at 909, 223 U.S.P.Q. at 986, and in the remaining portions of this opinion we will be guided by the relevant law in the Ninth Circuit, to the extent it can be discerned. n18

n18 It has been clearly stated that in appeals to this court under 28 U.S.C. § 1295(a) of cases involving patent and certain nonpatent counts, "it will be the role and duty of the advocates to brief and argue [the nonpatent counts] in the appeal . . . just as if they were appearing . . . before that circuit [from which the case originated]." *Atari*, 747 F.2d at 1440, 223 U.S.P.Q. at 1087. Such a rule could not in all fairness be applied in this case, as both of the appealed summary judgment decisions were argued and decided and all of the appeal briefs to this court were prepared and filed prior to the statement of the rule. Nevertheless, future litigants will be expected to frame their discussion of appealed nonpatent counts appropriately.

[\*\*43]

#### A. *Lanham Act Cause of Action*

Cable's federal nonpatent count is an action brought under the Lanham Act § 43(a), 15 U.S.C. § 1125(a)

(1982). In essence, it is charged that the commercial configuration of the Cable night light has [\*1030] come to designate origin, and thus that Genmark's use of an allegedly similar configuration in its own commercial product constitutes a prohibited false designation of origin.

Apart from what must be shown regarding an alleged copy in order to impose liability for copying, protection under the Lanham Act of the physical details and design of a product may be available if such features both (1) have acquired secondary meaning and (2) are nonfunctional. *Lvton Et Fils S.A. v. J. Young Enterprises, Inc.*, 644 F.2d 769, 772, 210 U.S.P.Q. (BNA) 351, 353-54 (9th Cir. 1981).

The district court concluded that Cable was not entitled to protection as a matter of law, based on the second requirement, by concluding that the functionality of the Cable night light design was beyond dispute. To so conclude, [\*44] it focused on the positions of Cable before the United States Patent and Trademark Office in obtaining allowance of the Schwartz utility patent and before the district court in opposing Genmark's motion for summary judgment on the patent count of this case. The argument Cable made was described as to the effect that the "night light's configuration was utilitarian -- indeed, patentably so, providing special advantages in compactness, efficient bulb change, and light diffusion." 586 F. Supp. at 1508, 223 U.S.P.Q. at 293. The district court thus held that Cable was bound by the argument it made on behalf of the nonobviousness of claims in a patent, n19 when the issue under consideration was the functionality of the actual design of a commercial device. In view of the considerations discussed below, the two can hardly be presumed to be even similar questions.

n19 An examination of the specification and prosecution history pertinent to the Schwartz patent, which are before us in the record, reveals no such argument made as to the utilitarian advantages mentioned by the district court. According to the customary practice, the argument of the parties below has not been included among the documents presented for our review. Thus, we are not in a position to verify or deny the correctness of the characterization of the district court, but do, out of deference to its proximity to the participants in argument below and because the matter has not been disputed by

770 F.2d 1015, \*1030; 1985 U.S. App. LEXIS 15064, \*\*44;  
226 U.S.P.Q. (BNA) 881

Cable, defer to its description of those arguments and presume the accuracy thereof for purposes of reaching our decision.

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Nonobviousness is a question of law fully reviewable on appeal. *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 1344, 220 U.S.P.Q. (BNA) 777, 782 (Fed. Cir.), cert. denied, 469 U.S. 830, 105 S. Ct. 116, 83 L. Ed. 2d 60, 225 U.S.P.Q. (BNA) 232 (1984). On the other hand, functionality in the context of this case is a question of a highly factual nature. See *Vuitton*, 644 F.2d at 775, 210 U.S.P.Q. at 356. When the district court ruled on the issue of functionality, it improperly deprived Cable of the right to have a fact-finding tribunal examine the actual evidence which has bearing on the functionality question.

Below it was not a matter of examining the evidence proffered and concluding that there existed "no genuine issue as to any material fact," as required for a grant of summary judgment. *Fed. R. Civ. P. 56(c)*. That point in analysis was never reached, because rather than looking to the actual evidence on nonfunctionality, the district court chose to utilize arguments made in relation to the meaning of invalid patent claims as admissions against interest about the factual nature of a product design. It did this, as far as [\*\*46] we can determine, without analytically verifying the soundness for doing so. The court appears not to have considered whether the meaning of those claims was so unavoidably identical to the details of the product design ultimately marketed as to warrant the desirability or suitability of the use of statements about the former as reliable or legally binding admissions about the latter.

In evaluating arguments made on behalf of the right to obtain or retain a patent, the proper object of scrutiny is the meaning of patent claims when compared to the teachings of the prior art. On the other hand, in assessing the right to protection from unfair product copying, the proper object of attention is the actual marketplace design of and marketing practices for an allegedly copied product when compared [\*\*1031] to those of the alleged copy. The aim of the patent system is to enhance the incentive for useful innovation; the aim of the Lanham Act, section 43(a), even in the context of product simulation, is to protect a trader's established identity. See *International Order of Job's Daughters v. Lindenburg & Co.*, 633 F.2d 912, 918-19, 208 U.S.P.Q. (BNA) 718,

724-25 (9th Cir. 1980), [\*\*47] cert. denied, 452 U.S. 941, 101 S. Ct. 3086, 69 L. Ed. 2d 956, 213 U.S.P.Q. (BNA) 1056 (1981) ("to protect consumers against deceptive designations of the origin of goods and, conversely, to enable producers to differentiate their products from those of others").

In resolving the question of product design functionality for purposes of the Lanham Act, section 43(a), the fact finder is to consider the appearance of the products in issue. Reference to utility patent claims that are, or have been, asserted to read on either product, or to the appearance of the device depicted in figures included in the patent specification supporting such claims, must be done with caution. Cf. *Best Lock Corp. v. Schlage Lock Co.*, 56 C.C.P.A. 1472, 413 F.2d 1195, 1199, 162 U.S.P.Q. (BNA) 532, 556 (1969) (cautioning that "a utility patent is only 'some evidence' as to functionality" in its explanation of statements in *In re Shenango Ceramics, Inc.*, 53 C.C.P.A. 1268, 362 F.2d 287, 292, 150 U.S.P.Q. (BNA) 115, 120 (1966)). See also, *In re Hollaender Manufacturing Co.*, 511 F.2d 1156, 1188, 185 U.S.P.Q. (BNA) 101, 102 (CCPA 1975); [\*\*48] *In re Honeywell, Inc.*, 497 F.2d 1344, 1348, 181 U.S.P.Q. (BNA) 821, 824 (CCPA 1974). Claims may be capable of reading on many devices of strikingly different configuration. Thus, even the fact that the claims read on two commercial devices in the marketplace is not support in itself for a finding that one is a copy of the other or confusingly similar thereto for section 43(a) purposes. A manufacturer may choose in its commercial embodiment of a patented device to less than faithfully replicate the exemplary depiction of a claimed embodiment shown in the figures of the patent. Hence, for purposes of evaluating the existence or impact of product copying, the relevance of patent figures depends on the extent to which their appearance is replicated in the actual marketplace product of the patentee. We have been shown no Ninth Circuit precedent to the contrary.

Concluding that the grant of summary judgment as to Cable's Lanham Act claim was improper, we vacate that portion of the case and remand it for further proceedings consistent with the above discussions. To guide [\*\*49] its analysis regarding functionality, the district court is to utilize the ample case law available from the Ninth Circuit.

#### B. State Causes of Action

The two California State causes of action contained

770 F.2d 1015, \*1031; 1985 U.S. App. LEXIS 15064, \*\*49;  
226 U.S.P.Q. (BNA) 881

in Cable's amended complaint will be treated together below. In one, a count for unfair competition, it is charged that Genmark, desiring not to create its own original night light design, but rather to trade upon the good will reposed by the purchasing public in the configuration and packaging of Cable's night light, deliberately copied both. In the other state count, the use of the configuration chosen by Genmark for its night light is alleged to contribute to the dilution and to constitute infringement of Cable's rights in California State trademark registration number 70905, which is apparently substantially identical in appearance to that of Cable's night light.

The district court granted summary judgment as to both state causes, dismissing them for essentially the same reasons. 586 F. Supp. at 1508, 223 U.S.P.Q. at 293. The state counts were said to present a "paradigm case" in which to apply the "established principles of federal preemption" of state-law [\*\*50] intellectual property protection found in *Sears, Roebuck & Co. v. Stiffel Co.*, 376 U.S. 225, 11 L. Ed. 2d 661, 84 S. Ct. 784, 140 U.S.P.Q. (BNA) 524, *reh'g denied*, 376 U.S. 973, 84 S. Ct. 1131, 12 L. Ed. 2d 87 (1964), and *Compcorp Corp. v. Day-Brite Lighting, Inc.*, 376 U.S. 234, 140 U.S.P.Q. (BNA) 528, 11 L. Ed. 2d 669, 84 S. Ct. 779, *reh'g denied*, 377 U.S. 913, 84 S. Ct. 1162, 12 L. Ed. 2d 183 (1964). As an "alternative ground" for its decision, the district court relied on its conclusion mentioned above that the functionality of [\*1032] Cable's product configuration was beyond dispute. That configuration was thus held not to be susceptible to protection under California law, either in the form of a registered state trademark, or as a product capable of being unfairly copied by competitors. *Id.* The error in the conclusion of the district court on functionality has already been addressed in relation to the Lanham Act count. Those same remarks are equally applicable to the dismissal of state causes of action. The discussion which follows will accordingly treat solely the issue of federal-state preemption. [\*\*51]

#### 1. Choice of Law

The Federal Circuit is vested with exclusive jurisdiction over the appeals of final decisions in cases before federal district courts only where the jurisdiction of those courts was based in whole or in part on the patent provisions of 28 U.S.C. § 1338. *See* 28 U.S.C. § 1295(a)(1). n20 In creating this nationwide subject matter jurisdiction in the area of patent appeals, it was the

intention of Congress to provide a forum that would increase doctrinal stability in the area of patent law and reduce forum shopping, which was considered to be common in patent litigation. n21 Nevertheless, section 1295(a)(1) does not limit the jurisdiction of the Federal Circuit over appeals from the district courts exclusively to the review of claims based on the patent laws. When patent claims are joined in the same case with other counts, the appeal of nonpatent counts accompanies the appeal of the patent count to this court. In such "mixed cases" this avoids the bifurcation of appeals between the Federal Circuit and the [\*52] regional circuit to which appeals from the district court of nonpatent counts would otherwise be directed. *See* H.R. Rep. No. 312, 97th Cong., 1st Sess. 41 (1981), quoted and discussed in *Atari, Inc. v. JS & A Group, Inc.*, 747 F.2d 1422, 1435, 223 U.S.P.Q. (BNA) 1074, 1083-84 (Fed. Cir. 1984) (in banc).

n20 *See supra* note 17.

n21 For the legislative history of the statute creating the United States Court of Appeals for the Federal Circuit, the Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, 96 Stat. 25, and the intention of Congress thereby to achieve this uniformity, see S. Rep. No. 97-275, 97th Cong., 2d Sess. 3-6, *reprinted* in 1982 U.S. Code Cong. & Ad. News 11, 13-16. Uniformity was also sought in federal personnel, government contract, and Little Tucker Act cases. 28 U.S.C. § 1295 (1982).

Congress recognized that this solution for reducing forum shopping in patent litigation and for avoiding bifurcated appeals, could through the [\*53] joinder of frivolous patent causes of action, for example, "create forum shopping opportunities between the Federal Circuit and the regional courts of appeals on other [nonpatent] claims." S. Rep. No. 97-275, 97th Cong., 2d Sess. 19-20, *reprinted* in 1982 U.S. Code Cong. & Ad. News 11, 30. Several appropriate responses by the circuit courts were recommended. *Id.*

In due course it became apparent that even the joinder of nonfrivolous patent counts with other nonpatent causes of action creates a potential for forum shopping in the appeal of the nonpatent causes.

770 F.2d 1015, \*1032; 1985 U.S. App. LEXIS 15064, \*\*53;  
226 U.S.P.Q. (BNA) 881

Recognizing that the motivation for such appeal forum shopping resides in the perceived opportunity to secure on appeal the application in the nonpatent counts of law differing from that which would otherwise be used in the regional circuit, this court sitting in banc at its own initiative declared in *Atari*, 747 F.2d at 1440, 223 U.S.P.Q. at 1087, its intention in the review of certain nonpatent matters to apply the "discernible law of the involved circuit" from which the appeal originated. n22

n22 This general principle had already been specifically effected by various three-judge panels of this court in reviewing specific procedural matters. *In re Medical Prosthetics Research Associates, Inc.*, 739 F.2d 618, 620 (Fed. Cir. 1984); *W.L. Gore & Associates, Inc. v. International Medical Prosthetics Research Associates, Inc.*, 745 F.2d 1463, 223 U.S.P.Q. (BNA) 884 (Fed. Cir. 1984); *Panduit Corp. v. All States Plastic Manufacturing Co.*, 744 F.2d 1564, 223 U.S.P.Q. (BNA) 465 (Fed. Cir. 1984) (all concerning attorney disqualification), and specific substantive matters. See *American Hoist & Derrick Co. v. Sowa & Sons*, 725 F.2d 1350, 1366-67, 220 U.S.P.Q. (BNA) 763, 775-76 (Fed. Cir.), cert. denied, 469 U.S. 821, 105 S. Ct. 93, 83 L. Ed. 2d 41 (1984) (the necessity of showing relevant market to establish a section 2 Sherman Act violation); *Bandag, Inc. v. Al Bokser's Tire Stores, Inc.*, 750 F.2d 903, 909, 223 U.S.P.Q. (BNA) 952, 956 (Fed. Cir. 1984) (infringement of federally registered trademarks). All were cited in *Atari*, 747 F.2d at 1438-40, 223 U.S.P.Q. at 1086-87, as having recognized the "freedom of the district courts to follow the guidance of their particular circuits in all but the substantive law fields assigned exclusively to this court."

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### [\*1033] 2. *Preemption*

Notwithstanding the fact that the Supreme Court has made several pronouncements on the interrelationship of the federal patent laws to state protection of intellectual property, n23 we conclude that the proper reach of the preemptive effect of the federal patent laws in relation to the diverse assortment of trade regulation laws existing in the fifty states is not a matter over which this court has a

mandate to unify the law evolved in the regional circuits.

n23 In addition to the *Sears* and *Compco* cases already cited, see, e.g., *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 181 U.S.P.Q. (BNA) 673, 40 L. Ed. 2d 313, 94 S. Ct. 1879 (1974); *Goldstein v. California*, 412 U.S. 546, 178 U.S.P.Q. (BNA) 129, 37 L. Ed. 2d 163, 93 S. Ct. 2303, reh'g denied, 414 U.S. 883, 38 L. Ed. 2d 131, 94 S. Ct. 27 (1973).

This issue [\*55] is not one that can come before this court in the appeal of a case that was based at the district court level solely on the patent provisions of 28 U.S.C. § 1338(a). The federal-state preemption question is presented exclusively in state intellectual property causes of action. When a patent cause is joined with a state intellectual property cause of action in a single "mixed" case, and both causes are appealed, the issue of federal-state preemption can reach this court for review. In the absence of a patent count below, the appeal of the state action and the associated preemption issue will be resolved in the regional circuit. Thus, the correct application of the preemption principles voiced in *Sears* and *Compco* is a responsibility which is shared between this court and the regional circuits.

Consequently, under the guidance of *Atari*, when the preemption issue is reviewed in this circuit we will apply the law that has evolved in the regional circuit in [\*56] which the case containing the issue was originally tried. Adopting this course will then assure that preemption is applied uniformly in the cases of a given regional circuit, whether they are appealed there or, by including a nonfrivolous patent cause of action, reviewed here. Such a rule will reduce the incentive for forum shopping with respect to a significant threshold issue in state causes of action.

### 3. *Disposition*

Unfortunately, when it decided whether the state counts pled by Cable in this case were preempted by *Sears* and *Compco*, the district court did not look to the law of the Ninth Circuit for standards or methodology. This was understandable because at that time the gathering consensus of this court regarding the correct body of law under which to review certain nonpatent matters had yet to be announced in our decision in *Atari*.

n24 Accordingly, neither the district court nor this one has had the benefit of any presentation by the parties on the issue of federal-state preemption in terms of the Ninth Circuit law which is proper to consult in this instance.  
n25

n24 The district court supported its decision that preemption applies in this case exclusively with the authority of *Litton Systems, Inc. v. Whirlpool Corp.*, 728 F.2d 1423, 1448-49, 221 U.S.P.Q. (BNA) 97, 113 (Fed. Cir. 1984). *Litton* not only preceded the *in banc* pronouncements on choice of law in *Atari*, but it held that preemption applied to a pair of Minnesota State causes of action without finding it necessary to address the choice of law issue. *Litton* did acknowledge the potential for a choice of law issue as to another nonpatent count there on appeal, a cause of action under section 43(a) of the Lanham Act, but explicitly refrained from resolving that choice in deciding the appeal. The correct body of law to apply in section 43(a) matters was determined subsequently in *Bandag, Inc. v. Al Bolser's Tire Stores, Inc.*, 750 F.2d 903, 909, 223 U.S.P.Q. (BNA) 982, 986 (Fed. Cir. 1984), which was issued on the same day as *Atari*.

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n25 See *supra* note 18.

Accordingly, the grant of summary judgment as to both state actions is vacated, and these counts are remanded for reconsideration [\*1034] by the district court in light of the *Atari* mandate to use local circuit law in doing so. This is done out of fairness to the litigants who should be able in our view to address the state causes in such terms before a decision is rendered. Nevertheless, we do so without making any suggestions as to what would be a correct resolution of the federal-state preemption issue when considered under the law of the Ninth Circuit. n26

n26 But cf. *Petersen Manufacturing Co. v. Central Purchasing, Inc.*, 740 F.2d 1541, 1550 n.10, 222 U.S.P.Q. (BNA) 562, 569 n.10 (Fed. Cir. 1984), where a panel of this court stated in

dicta that the Ninth Circuit precedent, *Tveter v. AB Turn-O-Matic*, 633 F.2d 831, 209 U.S.P.Q. (BNA) 22 (9th Cir. 1980), held in effect that the state law trademark claim in *Petersen* was properly dismissed under *Sears and Compco*.

[\*\*58]

#### IV. CONCLUSION

The grant of summary judgment based on the invalidity of the Schwartz patent is affirmed. The grant of summary judgment as to the Lanham Act and the two California State causes of action is vacated. Those causes are remanded for such further proceedings as are rendered appropriate by this opinion.

The conduct of discovery in this case is returned to the sound discretion of the district court. It is free at the request of either party to reconsider or affirm any of its earlier discovery rulings based on the legal issues and factual areas of inquiry that it deems have relevance to this case in view of the above discussions.

AFFIRMED-IN-PART, VACATED-IN-PART,  
AND REMANDED.

#### APPENDIX

In Claim 1 of the Schwartz patent bracketed material and paragraphing have been added below:

1. A portable light-sensitive electrical device capable of being used with and movable between one or more of a number of spaced existing conventional electrical receptacles of the type normally found mounted in walls, or the like, comprising in combination:

[a.] a housing having front, rear, side, top and bottom wall portions,

[b.] an electrical circuit carried within [\*\*59] said housing,

[c.] blade means electrically connected to said circuit with portions thereof extending from said housing for removably matingly engaging and being physically mounted to contacts of an electrical receptacle,

770 F.2d 1015, \*1034; 1985 U.S. App. LEXIS 15064, \*\*59;  
226 U.S.P.Q. (BNA) 881

[d.] lamp-receiving socket means electrically cooperative with said circuit and whose substantially sole source of current is from said receptacle,

[e.] and light-sensitive means carried by said housing and disposed so as to be able to receive ambient light for controlling current flow from one of said receptacle contacts to said socket means, allowing more current flow to said socket means as ambient light received by said light-sensitive means decreases and lesser current flow to said socket means as said received light increases,

said device being characterized by the absence of need for a power source other than that to which it is connected and

wherein said housing does not cover the receptacle openings and surrounding receptacle portions of the unused receptacle of a duplex receptacle to which the device is connected,

said light sensitive means including a photo conductive cell,

said device [further] including

[i.] an electric light  
[\*60] bulb with portions thereof mounted in said socket and

[ii.] a shade of predetermined shape and appearance,

said shade comprising front and side wall portions, said front wall portion having a generally planar surface extending between generally rectangular edges including longer vertically extending edges and relatively shorter horizontally extending edges, said side wall portions extending in a diverging manner generally [\*1035] symmetrically at a predetermined angle greater than 90 degrees away from said front wall portion toward a rearward plane of said housing,

said shade being formed . . . at said front wall portion with a generally polygonal-shaped pattern extending over substantially the entire front wall portion,

said shade further comprising bottom means capable of being swung inwardly to frictionally engage and disengage in a snap-on manner and be mounted to said housing in a position with respect to said housing illustrated in FIG. 1 of the drawing, said shade engagement and disengagement with said housing facilitating repeated replacement of said bulb.

LEXSEE 424 F.3D 1293

CROSS MEDICAL PRODUCTS, INC., Plaintiff-Appellee, v. MEDTRONIC SOFAMOR DANEK, INC. and MEDTRONIC SOFAMOR DANEK USA, INC., Defendants-Appellants.

05-1043

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

424 F.3d 1293; 2005 U.S. App. LEXIS 21200

September 30, 2005, Decided

**SUBSEQUENT HISTORY:** Rehearing denied by, Rehearing, en banc, denied by *Cross Med. Prods. v. Medtronic Sofamor Danek, Inc.*, 2005 U.S. App. LEXIS 25585 (Fed. Cir., Nov. 8, 2005).

**PRIOR HISTORY:** [\*\*1]Appealed from: United States District Court for the Central District of California Senior Judge Gary L. Taylor.

*Cross Med. Prods. v. Medtronic Sofamor Danek, Inc.*, 2005 U.S. Dist. LEXIS 6545 (C.D. Cal., Apr. 8, 2005)

**DISPOSITION:** AFFIRMED-IN-PART, REVERSED-IN-PART, VACATED-IN-PART, AND REMANDED.

**COUNSEL:** Bruce D. Kuyper, Latham & Watkins, LLP, of Los Angeles, California, argued for plaintiff-appellee. With him on the brief were Brian F. McMahon, Mark A. Finkelstein, Allan Z. Litovsky, and Jordan B. Kushner of Costa Mesa, California.

Dirk D. Thomas, Robins, Kaplan, Miller & Ciresi L.L.P., of Washington, DC, argued for defendants-appellants. With him on the brief were Robert A. Auchter, Jan M. Conlin and Munir R. Meghjee, of Minneapolis, Minnesota.

**JUDGES:** Before SCHALL, GAJARSA, and LINN, Circuit Judges.

**OPINION BY:** LINN

**OPINION**

[\*1296] LINN, Circuit Judge.

Medtronic Sofamor Danek, Inc. et al. ("Medtronic") appeals from an order of the United States District Court for the Central District of California ("district court") permanently enjoining Medtronic from infringing claim 5 of U.S. Patent No. 5,474,555 ("the '555 patent") owned by Cross Medical Products, Inc. ("Cross Medical"). See *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 2004 U.S. Dist. LEXIS 27643, No. SA CV 03-110-GLT(ANx) (C.D. Cal. Sept. 28, 2004). The [\*1297] permanent [\*\*2] injunction was issued following the grant of Cross Medical's motions for partial summary judgment of validity and infringement. See *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 2004 U.S. Dist. LEXIS 27644, No. SA CV 03-110-GLT(ANx) (C.D. Cal. Aug. 19, 2004) ("Invalidity Opinion"); *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 2004 U.S. Dist. LEXIS 14183, No. SA CV 03-110-GLT(ANx) (C.D. Cal. May 20, 2004) ("Infringement Opinion"). As a threshold matter, we conclude, over Cross Medical's objection, that we have jurisdiction over this appeal. On Medtronic's challenge to the district court's claim construction rulings, we affirm the district court's construction of the "anchoring means," "securing means," and "bear against said channel "limitations, but modify the district court's construction of the "anchor seat means" and "operatively joined" limitations. Because we find genuine issues of material fact regarding infringement, we reverse the grant of Cross Medical's motion for partial summary judgment of infringement and find no abuse of discretion in the denial of Medtronic's cross-motion for partial summary judgment of non-infringement. We also reverse the grant

of Cross Medical's motion for partial [\*\*3] summary judgment that claim 5 is not obvious but affirm the grant of that motion as to indefiniteness and anticipation. We further conclude that the district court did not abuse its discretion in denying Medtronic's cross-motion for summary judgment as to these invalidity issues. Consequently, we vacate the permanent injunction. Thus, we affirm-in-part, reverse-in-part, vacate-in-part, and remand.

## I. BACKGROUND

This appeal involves orthopedic surgical implants used to stabilize and align the bones of a patient's spine. A common problem with spinal fixation is determining how to secure the fixation device to the spine without damaging the spinal cord. Methods of fixation have developed which utilize wires that extend through the spinal canal and hold a rod against the lamina,<sup>1</sup> or that utilize pedicular screws which extend into the pedicle<sup>2</sup> and secure a plate which extends across vertebral segments. The system taught in *U.S. Patent No. 4,805,602* ("the '602 patent"), which is also assigned to Cross Medical and is part of the case against Medtronic but not involved in this appeal, exemplifies the advantages of both methods. The screw and rod system of the '602 patent provides a rigidity [\*\*4] which is intermediate between wired implant and plate systems. Several screw and rod systems are known in the art. Those which feature an anchor secured to the bone by a separate screw are termed "polyaxial." Polyaxial screws have a capability of pivoting in the anchor. Devices in which the anchor and the bone screw form a unitary body are deemed "monoaxial." Monoaxial screws have no ability to pivot relative to the anchor.

1 The "lamina" is part of the neural arch of a vertebra extending from the pedicle to the median line.

2 The "pedicle" is the basal part of each side of the neural arch of a vertebra connecting the laminae with the centrum.

Cross Medical's '555 patent discloses a device, an embodiment of which is illustrated in Figures 1, 2, and 3 below:

### [\*1298] GET DRAWING SHEET 1 OF 7

### GET DRAWING SHEET 1 OF 7

### GET DRAWING SHEET 1 OF 7

The '555 device allows a surgeon to place a series of bone screws 21, each carrying an anchor seat 23, into the bones of a patient. A stabilization rod 18 thereafter may be positioned in the channels 51, 52 of the anchor seats. The '555 device allows surgeons to secure the rod to the anchor seats with top-tightening [\*\*5] nuts 27. By connecting the rod in this fashion to the anchors on adjacent spinal bones, the position of the patient's spine may be fixed as desired by the surgeon.

On February 4, 2003, Cross Medical filed suit alleging that certain of Medtronic's polyaxial screws--MAS, Vertex, M8, Sextant, M10, Legacy 4.5, and Legacy 5.5--infringe the '555 patent and *U.S. Patent No. 5,466,237* ("the '237 patent"). The accused devices employ a "set screw," which features external threads to mate with the receiver member's internal threads, to hold the rod in the receiver member. The accused devices also include a "crown member" that lies between the rod and the bone screw. An illustration of the accused device follows, with explanatory text added.

### [SEE ILLUSTRATION IN ORIGINAL]

Medtronic denied infringement and counterclaimed seeking a declaratory judgment of non-infringement and invalidity. Subsequent to the initial pleading, responses and amended pleadings added claims and counterclaims relating to several additional patents, including the '602 patent. The district court resolved several issues through summary adjudication. Of importance to this appeal, the district [\*1299] court separately entertained [\*\*6] motions for partial summary judgment of infringement and validity of claim 5 of the '555 patent.

Claim 5 recites:

A fixation device for the posterior stabilization of one or more bone segments of the spine, comprising:

at least two anchors and an elongated stabilizer comprising a rod having a diameter and a longitudinal axis, said anchors each comprising *anchoring means* which secure said anchors to said bone segment and an *anchor seat means* which has a lower bone interface *operatively joined* to said bone segment and an anchor

seat portion spaced apart from said bone interface including a channel to receive said rod; and

*securing means* which cooperate with each of said anchor seat portions spaced apart from said bone interface and exterior to the bone relative to said elongated rod, said seat means including a vertical axis and first threads which extend in the direction of said vertical axis toward said lower bone interface to a depth below the diameter of the rod when it is in the rod receiving channel, and said securing means including second threads which cooperate with the first threads of the seat means to cause said rod to *bear against said* [\*<sup>7</sup>] *channel* through the application of substantially equal compressive forces by said securing means in the direction of the vertical axis and applied on either side along said longitudinal axis of said channel.

*'555 patent*, col. 8, ll. 33-57 (emphases added).

On May 29, 2004, the district court construed the "operatively joined," "securing means," and "bear against said channel" limitations of claim 5 of the '*555 patent*'. Based on these constructions, the court granted Cross Medical's motion for partial summary judgment of infringement, and denied Medtronic's cross-motion for partial summary judgment of non-infringement. On August 19, 2004, the district court additionally construed the "anchor seat means" and "anchoring means" limitations of claim 5 of the '*555 patent*'. The court then denied Medtronic's motion for partial summary judgment that claim 5 was anticipated, obvious, and indefinite, and granted Cross Medical's cross-motion for partial summary judgment that claim 5 was neither anticipated, obvious, nor indefinite.

On September 28, 2004, with proceedings still on-going with respect to the '*555 patent*' and other patents-in-suit, the district court granted Cross Medical's [\*<sup>8</sup>] motion for a permanent injunction to preclude Medtronic's infringement of claim 5 of the '*555 patent*'. The district court presumed irreparable harm because Cross Medical had prevailed on the merits at the summary judgment stage. Medtronic argued that there

could be no harm because it withdrew all of the asserted infringing devices from the market; however, the district court found that some of the infringing products remained available and that Medtronic had the capacity to bring infringing product back to market. On October 4, 2004, the district court stayed the injunction for 90 days to allow Medtronic time to appeal.

On October 13, 2004, Medtronic appealed from the order granting the injunction, asserting jurisdiction under 28 U.S.C. § 1292(a)(1), (c)(1). Medtronic asks this court to review the district court's claim construction rulings, reverse or vacate the district court's partial summary judgment orders on infringement, indefiniteness, anticipation, and obviousness with respect to claim 5 of the '*555 patent*', and vacate the permanent injunction. On November 19, 2004, Cross Medical filed a motion to dismiss this appeal for lack of jurisdiction.

## [\*<sup>1300</sup>] II. DISCUSSION

### [\*<sup>89</sup>] A. Jurisdiction

"Whether this court has jurisdiction over an appeal taken from a district court judgment is a question of law which we address in the first instance." *Pause Tech LLC v. TiVo Inc.*, 401 F.3d 1290, 1292 (Fed. Cir. 2005). Section 1292(a)(1) provides that the court of appeals has jurisdiction over appeals from interlocutory orders "granting, continuing, modifying, refusing or dissolving injunctions, or refusing to dissolve or modify injunctions." 28 U.S.C. § 1292(a)(1) (2000). Section 1292(c)(1) provides this court exclusive jurisdiction over an appeal of an interlocutory order granting an injunction if we would otherwise have jurisdiction under § 1295. *Id.* § 1292(c)(1). Medtronic appeals from an order permanently enjoining Medtronic from infringing the '*555 patent*'. On its face, the order falls within the scope of § 1292(a)(1), (c)(1).

Cross Medical argues that under *Woodard v. Sage Products, Inc.*, 818 F.2d 841 (Fed. Cir. 1987) (en banc), this court does not possess jurisdiction because the injunction is one in form but not substance. Cross Medical asserts that the injunction is not coercive because it [\*<sup>10</sup>] enjoins Medtronic from engaging in activities it had abandoned before the injunction issued. Cross Medical asserts that Medtronic simply should have sought a stay of the injunction pending appeal under *Federal Rule of Appellate Procedure 8(a)*. Alternatively, Cross Medical argues that even if the court has

jurisdiction to review the order, it has no jurisdiction to reverse or vacate the partial summary judgment rulings because no final judgment on the '555 patent has been entered, and the orders were not certified for appeal.

Medtronic counters that the order falls under § 1292(a)(1), (c)(1). Medtronic asserts that *Sage Products* is inapposite and that no case has denied jurisdiction in an appeal from the grant of an injunction. Medtronic states that Cross Medical argued below that the injunction was necessary to prevent irreparable harm, that Medtronic pulled products from the market to avoid a willfulness finding, that the district court entered the injunction with full knowledge of Medtronic's actions, and that it would be unfair to deny Medtronic its statutory right of appeal.

Cross Medical's reliance on *Sage Products* is misplaced. [\*\*11] In *Sage Products*, plaintiff's amended complaint included a prayer for injunctive relief, and the issue was whether plaintiff could lodge an appeal under § 1292(a)(1) from an order granting defendant's motion for summary judgment of non-infringement. *818 F.2d at 843-44*. There was no order specifically denying injunctive relief. *Id.* Instead, plaintiff argued that the adverse summary judgment ruling had the effect of denying injunctive relief. *Id. at 844*. This court sitting en banc considered the impact of the Supreme Court's then recent decision in *Carson v. American Brands, Inc.*, *450 U.S. 79, 67 L. Ed. 2d 59, 101 S. Ct. 993 (1981)*. We explained that *Carson* "instructed that an interlocutory appeal under section 1292(a)(1) requires (a) that the order be injunctive in nature, (b) that it cause a serious, if not irreparable, consequence, and (c) that the order can be effectively challenged only by immediate appeal." *Sage Products*, *818 F.2d at 849*. We held that Woodard failed to establish that the order met the *Carson* requirements. *Id. at 855*.

However, in reporting on how other courts interpreted *Carson* [\*\*12] , we criticized the Seventh Circuit for applying "the *Carson* requirements to an order explicitly granting an injunction," observing that "the Supreme Court in *Carson* expressly limited its holding to orders that have the practical effect of refusing an " injunction. [\*1301] *Id. at 850 n.6* (quoting *Carson*, *450 U.S. at 84*). We explained that "as a rule of general applicability to orders deemed to deny injunctions, the *Carson* rule is workable and sensibly balances the statutory provisions of sections 1291 and 1292(a)(1) in light of their respective purposes." *Id. at 853*. The

Supreme Court subsequently confirmed our reading of *Carson* as applying only to orders that have "the practical effect of granting or denying injunctions." *Gulfstream Aerospace Corp. v. Mayacamas Corp.*, *485 U.S. 271, 287-88, 99 L. Ed. 2d 296, 108 S. Ct. 1133 (1988)* ("Section 1292(a)(1) will, of course, continue to provide appellate jurisdiction over orders that grant or deny injunctions and orders that have the practical effect of granting or denying injunctions and have "serious, perhaps irreparable," consequence." (quoting *Carson*, *450 U.S. at 84* [\*13] (quoting *Baltimore Contractors, Inc. v. Bodinger*, *348 U.S. 176, 181, 99 L. Ed. 2d 233, 75 S. Ct. 249 (1955)*)); see also 19 James Wm. Moore et al., *Moore's Federal Practice* P203.10[2][a], at 12 (3d ed. 2005) ("Moore's") ("While the statute clearly applies to orders that formally grant injunctive relief, it also authorizes interlocutory appeals from orders that have the practical effect of granting an injunction."). Therefore, "if the district court's order expressly grants an injunction, the order is appealable under § 1292(a)(1), without regard to whether the appellant is able to demonstrate serious or irreparable consequences." *Moore's* P203.10[2][a], at 14.

In this case, the district court entered an order expressly enjoining Medtronic from infringing claim 5 of the '555 patent. Thus, *Carson* is inapplicable. See *PIN/NIP, Inc. v. Plate Chem. Co.*, *304 F.3d 1235, 1242 (Fed. Cir. 2002)* (finding jurisdiction without referring to the *Carson* test because "the district court's grant of a permanent injunction ...[brought the] appeal squarely within the confines of § 1292(a)(1)"). On appeal from the district court's grant of the injunction, [\*14] we have jurisdiction under 28 U.S.C. § 1292(a)(1).

Moreover, we may review the underlying partial summary judgment orders because they are inseparably connected to the merits of the permanent injunction. See *id. at 1242-48* (reviewing a summary judgment ruling that a claim was not anticipated by the prior art where jurisdiction was based on § 1292(a)(1), (c)(1)); *Katz v. Lear Siegler, Inc.*, *909 F.2d 1459, 1461 (Fed. Cir. 1990)* (reviewing propriety of joinder of counter-defendant on appeal from injunction); *Moore's* P203.10[7][b], at 45-47 ("[An interlocutory appeal under § 1292(a)(1)] enables the circuit court to review other orders that are inseparably or very closely connected with the merits of the injunctive order ...."). The district court presumed irreparable harm based on Cross Medical's success on the merits, which manifested itself in the summary judgment

orders concerning claim 5. Because Cross Medical's success on the merits turns on the propriety of the summary judgment rulings, our review of the grant of the permanent injunction requires that we rule on the summary judgment orders. *See Mendenhall v. Barber-Greene Co.*, 26 F.3d 1573, 1581 n.12 (Fed. Cir. 1994) (\*\*15) (noting "that an interlocutory appeal from a permanent injunction, to the extent that it considers questions of validity and infringement ... is identical in substance to an appeal brought under § 1292(c)(2)"). The cases cited by Cross Medical are not germane.

For these reasons, Cross Medical's motion to dismiss the appeal for lack of jurisdiction is denied.

#### B. Standard of Review

"We review the grant of a permanent injunction for an abuse of discretion which [\*1302] requires plenary review of the correctness of ...rulings on matters of law." *Stratos Mobile Networks USA, LLC v. United States*, 213 F.3d 1375, 1379 (Fed. Cir. 2000) (internal quotations omitted). We review the grant of a motion for summary judgment *de novo*. *Id.* However, we review the denial of a motion for summary judgment for abuse of discretion. *Gart v. Logitech, Inc.*, 254 F.3d 1334, 1338 (Fed. Cir. 2001). Summary judgment should only be granted "if the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as [\*1316] a matter of law." *Fed. R. Civ. P.* 56(c). In applying this standard, "the evidence of the non-movant is to be believed, and all justifiable inferences are to be drawn in [the non-movant's] favor." *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 255, 91 L.Ed.2d 202, 106 S.Ct. 2505 (1986). "The fact that both the parties have moved for summary judgment does not mean that the court must grant summary judgment to one party or the other...Cross-motions are no more than a claim by each party that it alone is entitled to summary judgment, and the court must evaluate each motion on its own merits, taking care in each instance to view the evidence in favor of the nonmoving party." *Bubble Room, Inc. v. United States*, 159 F.3d 553, 561 (Fed. Cir. 1998) (internal citation omitted); *accord Gart*, 254 F.3d at 1338-39.

Claim construction is a question of law reviewed *de novo*. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1328 (Fed. Cir. 2005) (en banc). Determination of

infringement is a *factual question*. *Bai v. L & L Wings, Inc.*, 160 F.3d 1350, 1353 (Fed. Cir. 1998). "Indefiniteness, [\*17] ...like claim construction, is a question of law that we review *de novo*." *Atmel Corp. v. Info. Storage Devices*, 198 F.3d 1374, 1378 (Fed. Cir. 1999). Anticipation is a question of fact. *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1281 (Fed. Cir. 2000). "Obviousness is a question of law based on underlying facts." *Group One Ltd. v. Hallmark Cards, Inc.*, 407 F.3d 1297, 1303 (Fed. Cir. 2005).

#### C. Claim Construction

In the course of its rulings on partial summary judgment for both infringement and validity, the district court construed the "anchoring means," "anchor seat means," "operatively joined," "securing means," and "bear against said channel" limitations of claim 5. Medtronic challenges each construction.

1. "anchors each comprising anchoring means ...and anchor seat means"

In the district court, the parties disputed whether either the "anchoring means" limitation or "anchor seat means" limitation imposed a requirement that the bone screws be polyaxial. The district court did not construe each limitation separately. Instead, the district court referred to its prior ruling in [\*18] *Cross Med. Prods. v. Depuy Acromed, Inc.*, 2003 U.S. Dist. LEXIS 26720, No. SA CV 00-576-GLT(AN), (C.D. Cal. Jan. 9, 2003), and explained that both the "anchoring means" and "anchor seat means" limitations were in § 112, P6 form and "must be construed by referring to the specification." *Invalidity Opinion* 2004 U.S. Dist. LEXIS 27644, [WL] at 3-4. The district court held that "although the claim language itself does not indicate whether the screws are polyaxial or monoaxial, the specifications and the drawings establish that the claims are limited to polyaxial screws." 2004 U.S. Dist. LEXIS 27644, [WL] at 3.

Medtronic asserts that although the preferred embodiment describes a polyaxial screw, there is no basis to read this feature into claim 5 because neither "anchoring means" nor "anchor seat means" are [\*1303] § 112, P6 limitations. Medtronic argues that even if these are § 112, P6 limitations, a monoaxial screw is an alternative embodiment and, thus, should be considered corresponding structure, citing *Micro Chemical, Inc. v. Great Plains Chemical Co.*, 194 F.3d 1250 (Fed. Cir. 1999). Medtronic also relies on the doctrine of claim

differentiation, arguing that the recitation in claim 1 of a polyaxial screw limitation implies that claim 5 does not possess that [\*\*19] limitation. Finally, Medtronic adds that Cross Medical is estopped from denying that claim 5 covers monoaxial screws because Cross Medical marked its monoaxial screws with the '555 patent number.

Cross Medical counters that both "anchoring means" and "anchor seat means" are § 112, P6 limitations and their corresponding structure is a polyaxial screw. Cross Medical argues that claim differentiation must give way to a proper § 112, P6 analysis and that the court should not consider "marking estoppel" in construing claim 5 because marking is extrinsic evidence. Cross Medical adds that claims should be construed to preserve their validity.

The limitations at issue are contained in the following text of claim 5:

said anchors each comprise *anchoring means* which secure said anchors to said bone segment and an *anchor seat means* which has a lower bone interface operatively joined to said bone segment and an *anchor seat portion* spaced apart from said bone interface including a channel to receive said rod....

...said *seat means* including a vertical axis and first threads which extend in the direction of said vertical axis toward said lower bone interface to a depth below [\*\*20] the diameter of the rod when it is in the rod receiving channel ....

'555 patent, col. 8, ll. 36-43, 46-51 (emphases added).

a. "anchoring means"

The limitation recites the word "means," which gives rise to the presumption that § 112, P6 applies. *See Rodime PLC v. Seagate Tech, Inc.*, 174 F.3d 1294, 1302 (Fed. Cir. 1999). The claimed function of the "anchoring means" is to "secure said anchors to said bone segment." '555 patent, col. 8, ll. 38-39. No structure is recited in the claim to perform this function. *See id.*, ll. 35-56. Thus, § 112, P6 applies and the "claim shall be construed to cover the corresponding structure ...described in the specification and equivalents thereof." 35 U.S.C. § 112, P6 (2000); *Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308,

1320 (Fed. Cir. 1999).

The specification discloses only one embodiment. That embodiment contains a screw which carries a separate anchor such that "when the screw 21 engages the anchor seat 23, a limited ball-and-socket joint is formed which permits freedom of movement between the rod support 23 and the screw 21." '555 patent, col. 5, ll. 4-47. The specification [\*\*21] unambiguously states that a feature of the "present invention" is that "each anchor seat is secured by a cancellous screw which cooperates through a sloped bore in the anchor seat so as to provide a limited ball and socket motion." *Id.*, col. 1, l. 65--col. 2, l. 21. It continues:

The present invention utilizes a rod and vertebral anchors which holds [sic] the rod in position. Each anchor is secured to the vertebrae by a transpedicular screw member.

....

...The present design utilizes two implant sets on either side of the spinous processes. Each implant set includes a ...rod .... Generally, an implant set is used on each side of the spinous process ....The rod is held in position by a stainless steel vertebral anchor which captures the rods. *The [\*\*1304] anchor has a seat member which is secured to the vertebrae by a stainless steel transpedicular screw. The screw is separate from the anchor seat and thus provides for limited motion between the anchor seat and the vertebrae.*

*Id.*, col. 3, ll. 26-67 (emphases is added). The patent discloses no other structure for securing the anchor to the bone. The patent states that the polyaxial design "acts as a 'shock-absorber' [\*\*22] to prevent direct transfer of load from the rod to the bone-screw interface prior to achieving bony fusion, thereby decreasing the chance of failure." *Id.*, ll. 63-67. Thus, the district court was correct both in linking the recited function to the structure disclosed in the specification and in concluding that the corresponding structure was polyaxial. Medtronic argues that even if the limitation is a means-plus-function limitation linked to the disclosed polyaxial structure, the

claim nonetheless should be construed to include alternative structures like monoaxial screws. However, because there is only one embodiment described in the specification to secure the anchor to the bone—a polyaxial screw and anchor structure—there is no basis on which to extend the limitation to cover alternative, non-disclosed structure not shown to be structurally equivalent. *See 35 U.S.C. § 112, P6; Al-Site, 174 F.3d at 1320.*

We reject the parties' remaining arguments. First, although the doctrine of claim differentiation suggests that claim 5 should be broader than claim 1, any presumption that the claims differ with respect to this feature may be overcome [\*\*23] by a contrary construction mandated by the application of § 112, P6. *See Laitram Corp. v. Rexnord, Inc., 939 F.2d 1533, 1538 (Fed. Cir. 1991)* (holding that the doctrine of claim differentiation yields to an interpretation mandated by § 112, P6). Second, Medtronic's assertion that "marking estoppel" applies is incorrect. Even if Cross Medical marked monoaxial screws with the '555 patent number, such evidence conflicts with the intrinsic record and has no bearing on our construction. *See Phillips, 415 F.3d at 1318* ("[A] court should discount [extrinsic evidence] that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent." (internal quotation omitted)); *cf. SmithKline Diagnostics v. Helena Labs. Corp., 859 F.2d 878, 890-91 (Fed. Cir. 1988)* (holding that an accused infringer's mis-marking of a product could not convert by estoppel an admittedly non-infringing product into an infringing product). Finally, Cross Medical's argument that we should consider the validity of claim 5 in construing [\*\*24] the limitation misses the mark. Because the other claim construction tools unambiguously resolve the claim construction dispute, considering validity would be improper. *Phillips, 415 F.3d at 1327* ("We have limited the maxim [of construing a claim to preserve its validity] to cases in which 'the court concludes, after applying all the available tools of claim construction, that the claim is still ambiguous.'").

#### b. "anchor seat means"

While the limitation recites the word "means," thus giving rise to the presumption that § 112, P6 applies, *see Rodime, 174 F.3d at 1302*, the claim language is sufficiently structural as to take the limitation out of the ambit of § 112, P6. Thus, the district court erred in

treating "anchor seat means" as a means-plus-function limitation; however, that error is harmless with respect to the conclusion that the claim covers polyaxial structures, based on the district court's correct construction of the "anchoring means" limitation, discussed *supra*.

#### [\*1305] 2. "operatively joined"

The district court construed "lower bone interface operatively joined to said bone segment" to mean "connected during a surgical procedure. [\*\*25] " *Infringement Opinion 2004 U.S. Dist. LEXIS 14183, [WE] at 5.* The district court interpreted "connect" to mean "in contact." *See id.* & n. 2. The district court reasoned that because the claim involves a surgical procedure, "operatively" means "involving surgical operations." *Id.* The district court explained that construing "operatively" to mean "to produce an appropriate effect" would improperly import a limitation from the specification. *2004 U.S. Dist. LEXIS 14183, [WE] at 4-5.*

Medtronic argues that the "bone interface" language surrounding the phrase "operatively joined" requires that there be contact between the bone segment and the anchor seat. Medtronic asserts that "operatively" means to produce an effect and that effect is micro-motion, which Medtronic describes as "limited motion" between the anchor and the bone. Medtronic argues that it would be inconsistent to construe claim 5 to require a polyaxial screw which enables polyaxial movement, but not to require a micro-motion effect. Medtronic adds that the district court's construction renders "operatively" superfluous because the only way to attach the screw to bone is via surgery.

Cross Medical counters that the "bone interface" is the portion of the anchor seat that [\*\*26] comes into contact with the bone when there is contact, but that "bone interface" does not require contact. Cross Medical argues that the district court correctly construed "operatively" to mean "surgically." Cross Medical asserts that even if we construe "operatively" to mean "effectively," the effect is posterior stabilization, not micro-motion. Cross Medical adds that "polyaxial" and "micro-motion" are not synonymous.

The claim recites an "anchor seat means which has a lower bone interface operatively joined to said bone segment." '555 patent, col. 8, ll. 39-42. The claim does not state explicitly whether the "bone interface" and the

"bone segment" must be in contact. However, we may refer to the dictionary to begin understanding the ordinary meaning of these claim terms, "so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents." *Phillips*, 415 F.3d at 1322-23 (internal quotations omitted). "Bone" modifies "interface," indicating that the anchor seat has a "lower" portion that may share a "common boundary" with "bone." *See Webster's Third New Int'l Dictionary* 1178 (2002) (defining "interface"). [\*\*27] The term "joined" describes the relationship between the "bone interface" and the "bone segment." Use of the word "joined" indicates that the "interface" and the "bone" must be brought together or connected to form a single unit, a whole, or a continuity, and thus that the interface and the bone are in contact. *See id.* at 1218 (defining "join").

The written description confirms that the interface must contact the bone. The screw is separate from the anchor seat, which prevents the direct transfer of load from the rod to the "bone-screw interface," and decreases the chance of failure of the "bone-screw interface." *Id.*, col. 3, ll. 19-22, ll. 64-67. This use of the term "interface" is consistent with its meaning a "common boundary" between two parts. Moreover, the patent refers to the "anchor" as being held, '555 patent, Abstract, or "secured" to the bone, *id.*, col. 3, ll. 59-60, and to the point of attachment as a "fusion bed," *id.*, col. 7, l. 15. These references suggest contact between the anchor seat and the bone. Furthermore, to adjust the height of the anchor posterior to the bone, the patent teaches the addition of washers that are the same diameter as the anchor [\*\*28] seat. *Id.*, col. 5, ll. 50-57. The [\*\*1306] washers co-act with the anchor seat to function as the bone interface while elevating the seat. If contact with bone were not contemplated, then there would be little need to add washers to elevate the seat. The drawings show contact between the anchor and bone, which is consistent with the description. *Id.*, Figures 3, 14, 17-20. Because the ordinary meaning of "interface" and "joined," as reflected in dictionary definitions and in the overall context of the intrinsic record, leads to the conclusion that a person of ordinary skill in the art would have understood these terms to require "contact" between the interface and the bone, the district court's construction in this regard was correct. It would be improper to construe "joined" more broadly to mean "connected" without requiring contact.

As to "operatively," the term is often used descriptively in patent drafting to mean "effectively" in describing the functional relationship between claimed components. *See, e.g., Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1118 (Fed Cir. 2004) ("[Operatively connected] is a general descriptive [\*\*29] term frequently used in patent drafting to reflect a functional relationship between claimed components."). Here, the preamble of the claim recites that the invention is operative when it effects posterior stabilization of one or more bone segments of the spine. '555 patent, col. 8, ll. 33-34; *see Innova*, 381 F.3d at 1118 (declining to decide whether preamble was an affirmative limitation, but recognizing that preamble recited the intended use corresponding to "operatively"). The body of the claim is consistent as it calls for anchors and a stabilizer rod, and provides detail on how these structures interrelate to stabilize the bone segment. *See '555 patent*, col. 8, ll. 35-57; *Innova*, 381 F.3d at 1118-19 (looking to the body of the claim to understand the purpose). Although the written description does not define "operatively," it consistently describes the purpose of the device to be for posterior stabilization. *See '555 patent*, col. 1, ll. 9-12 ("This invention relates generally to an apparatus for immobilization of the spine, and more particularly, to an apparatus for posterior internal fixation of the spine ..."); *Innova*, 381 F.3d at 1118-19 [\*\*30] (looking to the written description to understand the purpose). It discusses disadvantages of prior art spinal fixation methods and apparatuses, '555 patent, col. 1, ll. 13-64; col. 2, l. 36--col. 3, l. 25, details how the invention's features provide an advantageous fixation system, *id.*, col. 3, l. 26--col. 6, l. 44, and provides a method of spinal fixation therapy for use with the device, *id.*, col. 6, l. 45--col. 7, l. 50. Therefore, from the context of the written description, it is clear that one of ordinary skill in the art would have understood "operatively" to mean effective to produce posterior stabilization. The district court erred in construing "operatively" to mean "surgically." Because the only way a "fixation device" can provide "posterior stabilization" is through a surgical procedure, construing "operatively" to mean "surgically" renders the word superfluous, as used in the claim.

For all of these reasons, we modify the district court's claim construction and conclude that, in claim 5, the "lower bone interface [is] operatively joined to said bone segment" when the interface and the bone segment are connected and in contact such that the device is effective [\*\*31] to perform posterior stabilization.

### 3. "securing means"

The district court considered the "securing means" limitation to be in § 112, P6 form, and described its function as "applying a force to the rod, which compresses the rod against the anchor seats and secures the rod in place." *Infringement Opinion 2004 U.S. Dist. LEXIS 14183, [WL] at 6*. The district court explained [\*1307] that compression must be applied on "either side"--either inside or outside--of the rod-receiving channel. *2004 U.S. Dist. LEXIS 14183, [WL] at 7*. The district court identified the corresponding structure as an "outer nut." *2004 U.S. Dist. LEXIS 14183, [WL] at 6*.

Medtronic argues that the district court's interpretation of the function of the "securing means" somehow ignores the claim language: "through the application of substantially equal compressive forces ...applied on either side along said longitudinal axis of said channel." *555 patent*, col. 8, ll. 54-57 (emphasis added). Medtronic asserts that this language mandates that forces be applied along the longitudinal axis of the rod on "either side" of the channel and not on "either side" of the vertical axis. Medtronic interprets "either side" of the channel to be on the "outside" of the channel. Although Medtronic does not dispute [\*32] that the corresponding structure is an external nut, Medtronic argues that the written description and prosecution history show a disavowal of equivalents to an external nut.

Cross Medical responds that the district court did not ignore the "either side" limitation, and that, in any event, "either side" can mean that the forces are applied "inside" the channel. Cross Medical provides the illustration that standing on "either side" of the room would connote standing inside the room. Cross Medical adds that the specification and prosecution history do not evince a disavowal, and that claim differentiation doctrine supports structural equivalents.

The claim requires:

at least two anchors and an elongated stabilizer comprising a rod having a diameter and a longitudinal axis ....

securing means which cooperate with each of said anchor seat portions ...said securing means including second threads which cooperate with the first threads of

the seat means to cause said rod to bear against said channel through the application of substantially equal compressive forces by said securing means in the direction of the vertical axis and applied on either side along said longitudinal [\*33] axis of said channel.

*'555 patent*, col. 8, ll. 36-37, 44-57.

We agree with the parties that the limitation is in § 112, P6 format. *See Rodime*, 174 F.3d at 1302 (noting that a concession by the parties that the claim is in § 112, P6 form does not relieve the court of its duty to examine whether § 112, P6 applies). The claim recites "securing means," which gives rise to the presumption that § 112, P6 applies. *See id.* The function is "to cause said rod to bear against said channel through the application of substantially equal compressive forces by said securing means in the direction of the vertical axis and applied on either side along said longitudinal axis of said channel." *'555 patent*, col. 8, ll. 53-57.

"Either side" does not refer to "either side" of the rod on the vertical axis of the channel perpendicular to the rod, because that interpretation would render the "in the direction of the vertical axis" language redundant. The "and" in the phrase "in the direction of the vertical axis and applied on either side" makes that clear. Therefore, the function is to cause the rod to bear against the rod-receiving channel by applying a compressive [\*34] force in the direction of the vertical axis while ensuring that substantially equal forces are applied along the longitudinal axis of the rod on opposite sides--either inside or outside--of the rod-receiving channel.

We must now determine whether the claim recites structure to carry out that function. The claim states that the "securing means ...cooperate with each of said anchor seat portions," *id.*, ll. 44-45, in that the "securing means includes second threads which cooperate with the first threads of the seat means to cause [the [\*1308] desired function]." *id.*, ll. 51-57. Although it is the operation of the threads that causes the rod to bear against the channel by applying a compressive force in the direction of the vertical axis, a naked incantation of threads alone does not ensure that substantially equal forces are applied along the longitudinal axis of the rod on opposite sides of the rod-receiving channel. Because there is no sufficient structure recited for performing the specified function, §

*112, P6* applies. Thus, we construe the claim "to cover the corresponding structure ...described in the specification and equivalents thereof."

The structure for performing the recited [\*\*35] function is described as follows:

The nut 27 includes internal threads 83 which engage the external threaded area 76 on the anchor seat. The nut 27 is a hex nut which can be tightened relative to the seat 25.

As the nut 27 is rotated about the anchor seat 25, it cooperates with the top side of the flange 46,47 to tighten on the clamp 25 in relation to the rod support 23. The rod 18 is grasped in the tunnel 84 formed between the rod-receiving channel 54 of the anchor seat 23 and the arch 72 of the cap 25.

The threads 76 on the anchor seat 23 extend downwardly on the seat below the top of the cylindrical surface of the rod 18 as is shown in FIG. 2 and the nut 27 has a relatively constant diameter through the bore as is shown in FIGS. 2 and 4. Accordingly, the nut 27 can be screwed directly onto the anchor seat 23 to compressively hold the rod without the cap 25.

'555 patent, col. 6, ll. 9-24. Figures 5 and 7 depict the rod 18 in the channel created by the anchor seat 23, with the nut 27 securing the rod in place. Thus, the structure that corresponds to the claimed function is a nut with internal threads cooperating with the external threads of the anchor seat (an "external [\*\*36] nut"). The claim covers that structure and equivalents thereof.

We are not persuaded by Medtronic's argument that the written description shows a disavowal of equivalents. Although we need not decide that there can never be a disavowal of *§ 112, P6* equivalents, "§ 6 112-was written precisely to avoid a holding that a means-plus-function limitation must be read as covering only the means disclosed in the specification." *D.M.I., Inc. v. Deere & Co.*, 755 F.2d 1570, 1574 (Fed. Cir. 1985). In this case, the inventors were merely describing the structure that performs the claimed function.

Nor are we persuaded that the prosecution history shows a disavowal. In an August 4, 1994 Office Action ("Office Action"), the Examiner rejected the apparatus claims, in part, under *§ 112, P1*, because "the specification failed to provide an enabling description of the embodiment of the action device excluding the cap/cap means," and because "language directed toward the 'securing means' cooperating with the seat means through application of compressive forces by the securing means" failed to have support in the specification. *Office Action* at 4. Subsequent to that rejection, [\*\*37] an interview was held with the Examiner and the Examiner Interview Summary referred to "securing means" as "i.e., the nut." In addition, Remarks in the April 27, 1995 Amendment ("Amendment") stated that Applicant amended the claims "to define the anchor seat means having a channel and threads which cooperate with the securing means (i.e., the nut) so as to capture the stabilizer between the channel and the securing means." *Amendment* at 4. However, Applicant did not add language in claim 5 that limited securing means to a nut. The statements referring to "securing means" as "i.e., the nut" simply help to provide the requisite [\*\*1309] linkage between the function recited in the claim and the "corresponding" structure. *See Default Proof Credit Card Sys., Inc. v. Home Depot U.S.A., Inc.*, 412 F.3d 1291, 1298 (Fed. Cir. 2005) ("A structure disclosed in the specification qualifies as "corresponding" structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim."). Applicant did not disclaim all structural equivalents.

Therefore, the district court correctly construed the "securing means" limitation [\*\*38] to refer to the external nut described in the written description. Under *§ 112, P6*, the claim also covers equivalents thereof.

#### 4. "bear against said channel"

The parties dispute whether the language of claim 5 reciting that the "rod ...bears against said channel" precludes the presence of any intervening structure between the rod and the channel. The district court held that "there is nothing in the [language of claim 5] which excludes an anchor channel composed of more than one component part." *Infringement Opinion 2004 U.S. Dist. LEXIS 14183, [WL] at 8*. Medtronic argues that the district court's construction is erroneous, and that by placing a separable crown member over the anchor seat,

Medtronic has prevented the rod from "bearing against [the] channel" as a matter of law. Medtronic asserts that the anchor seat must form the channel and the crown is not part of the anchor seat. Cross Medical responds that claim 5 does not require that the channel of the anchor seat be a unitary component and thus does not preclude a finding that the crown is part of the anchor seat.

The dispute reduces to whether the "channel" must be formed in a unitary structure. The claim requires that the anchor seat means have [\*\*39] "an anchor seat portion spaced apart from said bone interface including a channel to receive said rod," '553 patent, col. 8, ll. 41-42, and that the "securing means ...causes said rod to bear against said channel," *id.*, ll. 51-54. The claim does not state that the anchor seat portion forming the channel is unitary. Although the sole embodiment described in the specification depicts a unitary structure, *id.*, col. 5, ll. 20-21, the mere depiction of a structural claim feature as unitary in an embodiment, without more, does not mandate that the structural limitation be unitary. *See CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1367 (Fed. Cir. 2002) (holding that "member" encompassed a multi-component structure where the preferred embodiment showed single-component structure, but the specification did not otherwise require a certain number of components). There is nothing in the written description or prosecution history that limits the channel to being formed in a single-component structure. Thus, the district court correctly concluded that the "bear against said channel" language of claim 5 does not exclude an "anchor seat portion" composed of multiple [\*\*40] components.

#### D. Infringement

The district court ruled as a matter of law that the accused devices met the "operatively joined," "securing means," and "bear against said channel" limitations, that Medtronic was a direct infringer, and that alternatively, Medtronic either contributed to infringement or induced infringement. *Infringement Opinion*, 2004 U.S. Dist. LEXIS 14183, [WLJ] at 4-9. Medtronic appeals.

##### 1. "operatively joined"

The district court held that the accused devices met the "operatively joined" limitation as a matter of law because "the accused device, to be infringing, need only be capable of operating in the [infringing] mode ...actual [infringing] operation in the accused device is not "

required. 2004 U.S. Dist. LEXIS 14183, [WLJ] at 5-6 [\*\*1310] (quoting *Intel Corp. v. U.S. Int'l Trade Comm'n*, 946 F.2d 821, 832 (Fed. Cir. 1991)). The district court cited *Hilgraeve Corp. v. Symantec Corp.*, 265 F.3d 1336, 1343 (Fed. Cir. 2001), for the proposition that "an accused device may be found to infringe if it is reasonably capable of satisfying the claim limitations, even though it may also be capable of non-infringing modes of operation." *Infringement Opinion*, 2004 U.S. Dist. LEXIS 14183, [WLJ] at 5. The court explained that [\*\*41] Medtronic's devices "are capable of operative joinder to the bone segment, and are sometimes used in this way." 2004 U.S. Dist. LEXIS 14183, [WLJ] at 5-6. In response to Medtronic's argument that it could not directly infringe because it did not perform surgery, the district court held that "under 35 U.S.C. § 271 Defendants can be liable for inducing the infringement or for selling a device which constitutes part of the invention." 2004 U.S. Dist. LEXIS 14183, [WLJ] at 8.

Medtronic argues that it does not itself make an anchor seat which contacts bone and it does not perform surgery. Medtronic asserts that *Intel* and *Hilgraeve* are inapposite and that it cannot be a direct infringer simply because its accused devices are capable of being made into infringing devices by surgeons. Medtronic adds that it does not induce or contribute to infringement because there is no evidence of physicians bringing the receiver member into contact with the bone segment to make the claimed apparatus; because Medtronic does not design the receiver member to contact the bone segment; and because Medtronic instructs surgeons not to place the device into contact with the bone.

Cross Medical counters that to directly infringe, [\*\*42] Medtronic need only make devices that are capable of being converted into infringing devices, citing *Intel, Hilgraeve, and Bell Communications Research v. Vitalink Communications Corp.*, 55 F.3d 615 (Fed. Cir. 1995). Cross Medical asserts that Medtronic's argument that it does not directly infringe because it does not perform surgery is as superficial as the non-infringement argument concerning the "Commissioner.com" product in *Fantasy Sports Props., Inc. v. SportsLine.com, Inc.*, 287 F.3d 1108 (Fed. Cir. 2002), and therefore must fail. Furthermore, Cross Medical argues that Medtronic's representatives are present in the operating room and thus that Medtronic performs surgery. Alternatively, Cross Medical argues that Medtronic induces infringement because it sells devices to surgeons, designs its anchors to

function when in contact with bone, and intends that surgeons bring the anchor seat into contact with bone; and because surgeons actually bring the anchor seat into contact with bone. Cross Medical asserts that Medtronic is a contributory infringer because it has not proven that there are substantial non-infringing uses.

"Whoever without authorization [\*\*43] makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor [directly] infringes the patent." 35 U.S.C. § 271(a) (2000). To prove direct infringement, the plaintiff must establish by a preponderance of the evidence that one or more claims of the patent read on the accused device literally or under the doctrine of equivalents. *Advanced Cardiovascular Sys., Inc. v. SciMed Life Sys., Inc.*, 261 F.3d 1329, 1336 (Fed. Cir. 2001). "Literal infringement requires that each and every limitation set forth in a claim appear in an accused product." *Frank's Casing Crew & Rental Tools, Inc. v. Weatherford Int'l, Inc.*, 389 F.3d 1370, 1378 (Fed. Cir. 2004) (internal citation omitted). Claim 5 of the '555 patent is an apparatus claim. See '555 patent, col. 8, ll. 34-57. We held in Part II. 2 C. *supra* that the "operatively joined" limitation requires that "the interface and the [1311] bone segment are connected and in contact such that the device is effective to perform posterior stabilization."

In support of its argument [\*\*44] that Medtronic directly infringes, Cross Medical cites evidence that Medtronic's representatives appear in the operating room, identify instruments used by surgeons, and thus in effect "join" the anchor seat to the bone. Cross Medical argues that the situation is analogous to those in which courts have found a party to directly infringe a method claim when a step of the claim is performed at the direction of, but not by, that party. See, e.g., *Shields v. Halliburton Co.*, 493 F. Supp. 1376, 1389 (W.D. La. 1980). However, if any one makes the claimed apparatus, it is the surgeons, who are, as far as we can tell, not agents of Medtronic. Because Medtronic does not itself make an apparatus with the "interface" portion in contact with bone, Medtronic does not directly infringe.

Nor does *Intel* support a finding of direct infringement. The claim at issue in *Intel* called for a "programmable selection means" and thus required only that an accused device be capable of operating in the enumerated mode. 946 F.2d at 832; see *Fantasy Sports*,

287 F.3d at 1117-18; *High Tech Med. Instrumentation Inc. v. New Image Indus., Inc.*, 49 F.3d 1551, 1555-56 (Fed. Cir. 1995). [\*\*45] Here, the claim does not require that the interface be merely "capable" of contacting bone; the claim has a structural limitation that the anchor seat be in contact with bone. See *Fantasy Sports*, 287 F.3d at 1117-18 (stressing the "programmable" language of the claim at issue in *Intel* and holding that *Intel* "does not stand for the proposition ...that infringement may be based upon a finding that an accused product is merely capable of being modified in a manner that infringes the claims of a patent"); *High Tech*, 49 F.3d at 1555-56 (distinguishing *Intel* based on the permissive language of the claim at issue). Cross Medical would distinguish *High Tech* by asserting that the device in that case had to be physically altered to become infringing, while Medtronic's device need not be altered. However, Cross Medical again fails to recognize that the limitation--the anchor seat being in contact with bone--is absent until the screw and anchor are put in place during surgery.

*Bell Communications* and *Hilgraeve* are also inapposite. In *Bell Communications*, plaintiff asserted that defendant's product embodied a claimed method, but the [\*\*46] district court granted summary judgment of non-infringement reasoning that the product had non-infringing modes of operation. 55 F.3d at 618-19. In *Hilgraeve*, plaintiff asserted that defendant sold software that, when in operation, infringed plaintiff's method claim, but the district court granted summary judgment of non-infringement based on rationale similar to that in *Bell Communications*. See *Hilgraeve*, 265 F.3d at 1339-40. In both cases on appeal, this court held that the district court had erred by overlooking the rule that "an accused product that sometimes, but not always, embodies a claimed method nonetheless infringes." *Bell*, 55 F.3d at 622-23; accord *Hilgraeve*, 265 F.3d at 1343 ("So too the sale of a device may induce infringement of a method claim even if the accused device is capable of non-infringing modes of operation in unusual circumstances."). However, a rule that governs infringement of a method claim may not always govern infringement of an apparatus claim. See, e.g., *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 2005 U.S. App. LEXIS 15920 (Fed. Cir. 2005) (distinguishing between method [\*\*47] claims and apparatus claims for the purpose of determining infringement under section 271(a)). To infringe an apparatus claim, the device [\*\*1312] must meet all of the structural limitations. See *Hewlett-Packard Co. v. Bausch & Lomb, Inc.*, 909 F.2d

1464, 1468 (Fed. Cir. 1990) ("Apparatus claims cover what a device is, not what a device *does*."); *In re Michlin*, 45 C.C.P.A. 1028, 256 F.2d 317, 320, 1958 Dec. Comm'r Pat. 408 (C.C.P.A. 1958) ("It is well settled that patentability of apparatus claims must depend upon structural limitations and not upon statements of function."). In this case, claim 5 is an apparatus claim which contains the structural limitation that the anchor seat contact bone. Cross Medical has not proven that Medtronic makes an apparatus with an anchor seat in contact with bone.

Cross Medical's reliance on *Fantasy Sports* is also misplaced. In *Fantasy Sports*, the apparatus claim called for "[a] computer for playing football." 287 F.3d at 1111. The district court found that the accused "Commissioner.com" product did not infringe because it was a "modifiable software tool," not a computer for playing football. *See id.* at 1118. [\*48] We disagreed, holding that Sportsline directly infringed by making or using the apparatus because no reasonable juror could find that the "Commissioner.com" product was not software installed on a computer. *See id.* at 1118-19. Cross Medical argues that the theory that Medtronic does not directly infringe because it does not itself contact the anchor seat to the bone is as superficial as Sportsline's theory that its product was software but not a computer. However, unlike in *Fantasy Sports*, in this case, no reasonable juror could find that the accused infringer itself makes or uses the entire claimed apparatus. The anchor seat of the device does not contact bone until the surgeon implants it.

Because Medtronic is not a direct infringer, we next consider whether Medtronic induces or contributes to infringement. Under § 271(b), "whoever actively induces infringement of a patent shall be liable as an infringer." 35 U.S.C. § 271(b). In order to succeed on a claim of inducement, the patentee must show, first that there has been direct infringement, and second, that the alleged infringer knowingly induced infringement and possessed specific [\*49] intent to encourage another's "infringement. *MEMC Elec. Materials, Inc. v. Mitsubishi Materials Silicon Corp.*, 420 F.3d 1369, 1378 (Fed. Cir. 2005) (quoting *Minn. Mining & Mfg. Co. v. Chemique, Inc.*, 303 F.3d 1294, 1304-05 (Fed. Cir. 2002)). Under § 271(c), "whoever offers to sell or sells within the United States ... a component of a patented machine, manufacture, combination or composition...constituting a material part of the invention, knowing the same to be

especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer." 35 U.S.C. § 271(b). In order to succeed on a claim of contributory infringement, in addition to proving an act of direct infringement, plaintiff must show that defendant "knew that the combination for which its components were especially made was both patented and infringing" and that defendant's components have "no substantial non-infringing uses." *Golden Blount, Inc. v. Robert H. Peterson Co.*, 365 F.3d 1054, 1061 (Fed. Cir. 2004) [\*50] (internal quotations omitted).

As to the predicate act of direct infringement, we conclude that there is a genuine issue of material fact as to whether surgeons infringe by making the claimed apparatus. The only evidence that Cross Medical cites suggesting that the anchor seat contacts bone is the statement of Medtronic's employee, Michael Sherman, during his January 29, 2004 deposition:

[\*1313] Q. How far down do you screw the screw initially?

A. Well, it depends. Because if you screw these screws all the way down, they stop rotating. And the rotating around the ball is a feature of the screw. So you lose some of your ability to rotate, or your freedom.

Because the reason these screws have multiple angles is to make it easier to assemble the system in the patient. So if you screw these things down super-tight, you may have-you know, you've eliminated the multiaxial capability of the screw.

So the surgeon in his judgment gets it down, and I like to tell them, as far as they feel comfortable doing and still have some rotation. Because the further in the instrumentation is into the patient, the lower - the closer the instrumentation is to the loads, and thus the lower the bending [\*51] moments are on the instrumentation and the less likelihood of metal failure.

Q. In practice, in some instances the screw is screwed down such that the receiver touches the bone; is that right?

A. I'm sure some surgeons do that. And it can touch the bone and still move a little because the bone is elastic. And the tissue right on top of the bone isn't necessarily bone. It's periosteum. It's deformable.

Medtronic counters with an April 22, 2004, declaration from Kevin Foley, M.D., a board certified neurosurgeon, who has performed over 500 operations using Medtronic's allegedly infringing products. Dr. Foley states, in pertinent part, that:

in all of the surgeries I perform using Medtronic Products, I try to minimize or avoid contact of any part of the receiver member to the patient's spinal anatomy to ease the eventual implantation of the rod. I do not count on any type of direct connection between the receiver member and the patient's spine to impart any stability to the spine or to the implant construct ...

When implanting the Medtronic Products in a patient's spine, any contact between the receiver member and any portion of the patient's anatomy is incidental to [\*\*52] the surgery and not intended to impart any stability to the spine. In fact, when I instruct other spine surgeons in how to implant the Medtronic Products, I tell them that if they tighten down on the bone screw enough to bring the receiver member into engagement with the spine, they should back off the bone screw by one-quarter to one-half turn so as to better enable alignment of the receiver members with the rod.

Thus, Sherman--who is not testifying that he witnessed contact--speculates that some surgeons may bring the receiver member into contact with bone. Dr. Foley confirms that from time to time, "incidental to the surgery," the receiver member comes into contact with bone. However, Dr. Foley also suggests that he "tries to

minimize or avoid contact" and instructs others to "back off the bone screw by one quarter to one-half turn" "if they tighten down on the bone screw enough to bring the receiver member into engagement with the spine."

On the one hand, drawing inferences in favor of Medtronic, a reasonable juror could conclude that the apparatus is not made because, more likely than not, there is no contact between the receiver member and the bone. On the other hand, drawing [\*\*53] inferences in favor of Cross Medical, a reasonable juror could conclude that the apparatus is made by surgeons. Sherman's statements suggest that the device is capable of posterior stabilization when the receiver member contacts bone, and the statements of both Sherman and Dr. Foley suggest that there may be some [\*\*1314] contact between the receiver member and the spine. We leave it to the fact finder to decide whether surgeons directly infringe.

As to inducement, there is a genuine issue of material fact both as to whether Medtronic "knowingly induced infringement" and as to whether Medtronic "possessed specific intent to encourage [the surgeons'] infringement." On the one hand, in the record are Medtronic's "Field Bulletins" instructing surgeons that the proper technique for installation of the Medtronic device is with the receiver member not in contact with the bone. Medtronic asserts that these materials, together with Dr. Foley's statement, show that it had no knowledge that the surgeons made the claimed apparatus and that it had no specific intent to encourage infringement. On the other hand, Cross Medical points to Sherman's statements--that he would instruct surgeons to screw the [\*\*54] receiver member down "as far as they feel comfortable doing and still have some rotation" and that "[t]he receiver member [can] touch the bone and still move a little because the bone is elastic"--as evidence that Medtronic anticipated that surgeons would contact bone and intended that the device function when in contact with bone. Drawing inferences in favor of Medtronic, a reasonable juror could find that Medtronic did not know that surgeons make the claimed apparatus and, moreover, did not specifically intend for surgeons to contact bone with the anchor seat. Drawing inferences in favor of Cross Medical, a reasonable juror could find that Medtronic designed its device to function when the anchor seat contacted bone, anticipated that surgeons would contact the anchor seat to bone, and thus intended for the surgeon to make or use the apparatus as claimed.

As to contributory infringement, there is a genuine issue of material fact as to whether there are substantial non-infringing uses of Medtronic's devices, specifically, uses of the devices with no receiver member-to-bone contact. Drawing inferences in favor of Medtronic, a reasonable juror could conclude, based on Dr. Foley's statements, [\*\*55] that a substantial number of surgeries occur in which the claimed apparatus is not made or used, as surgeons are able to avoid contact between the seat and bone. Drawing inferences in favor of Cross Medical, a reasonable juror might also conclude that in almost every surgery, the claimed apparatus is made or used, as some contact between the receiver member and the bone is incidental.

Therefore, the district court erred in ruling both that there were no genuine issues of material fact as to infringement and that Medtronic infringed as a matter of law.

## 2. "securing means"

The district court ruled that Medtronic's "set screw" is equivalent to the external nut as a matter of law because it performs compression in "substantially the same way" to achieve "substantially the same result" as the "external nut." *Infringement Opinion, 2004 U.S. Dist. LEXIS 14183, [WL] at 6*. The district court cited testimony that the set screw has opposite points of contact on the rod 180 degrees apart, noted that the screw is intended to be coaxial with the anchor means, and explained that "although Plaintiff does not provide tests showing the magnitude of the force on either side, everything before the Court supports the conclusion [\*\*56] the forces are substantially equal." *2004 U.S. Dist. LEXIS 14183, [WL] at 7*. The district court added that "defendants submitted no evidence to show the forces are not equal." *Id.* The district court reasoned: "viewing the devices themselves and the testimony, it appears Defendants' inner screw meets the limitation applying [\*\*1315] substantially equal compressive forces on either side of the channel." *Id.*

Medtronic argues that a set screw is not equivalent to an external nut as a matter of law, citing *Chiuminatta Concrete Concepts Inc. v. Cardinal Industries, Inc.*, *145 F.3d 1303 (Fed. Cir. 1998)*. Medtronic notes that the '555 patent's express reference to the use of a set screw to attach a cross-link to the rod, but lack of a reference to a set screw to lock the rod to the anchor seat, is compelling evidence of non-equivalents. In addition, Medtronic

asserts that set screws and external nuts are not interchangeable because set screws apply a "splaying" force to the side walls of the anchor seat while external nuts do not; an external nut applies compressive forces to the rod in a way that bows or bends the rod upwardly in the anchor seat channel while the set screw minimizes this type of load [\*\*57] on the rod; and bowing creates a problem in Medtronic's devices. Medtronic adds that Dr. Puno, an inventor of the '555 patent, testified that a set screw and an external nut were not interchangeable. Medtronic portrays as unsupported the views of Dr. Villarraga, Cross Medical's ex pert, who opined that the set screw and external nut are interchangeable. Medtronic argues that Cross Medical has offered no evidence that the set screw applies "substantially equal compressive forces" to the rod; and asserts that Michael Sherman offered convincing testimony that they do not. Medtronic asserts that at the least, there is a genuine issue of material fact as to whether the set screw is an equivalent.

Cross Medical argues that a set screw and external nut perform the function of compression in substantially the same way--applying a downward force on a rod achieved by engaging threads of the receiver--to achieve the identical result--securing the rod in the channel; and that *Chiuminatta* is distinguishable. Cross Medical cites evidence that the set screw applies force to opposite sides of the channel. Cross Medical asserts that, because the compression being applied from the set screw to [\*\*58] the rod would be through absolutely equal forces applied on either side of the channel absent machining imperfections and patient physiology, if one were to account for these factors, the forces would be substantially equal. Cross Medical argues that "splaying" and "bowing" do not affect equivalents and that Dr. Villarraga's opinion on interchangeability is properly based on her knowledge of mechanical engineering and her examination of the devices. Cross Medical asserts that Dr. Puno's testimony on interchangeability is irrelevant. Cross Medical argues that Medtronic admitted in *U.S. Patent No. 6,660,004* ("the '004 patent") that the set screw and external nut were interchangeable. Cross Medical additionally asserts that because Medtronic argued that a set screw and external nut are equivalent to invalidate claims of another patent, Medtronic is estopped from asserting that they are not equivalent.

"Literal infringement of a § 112, P6 limitation requires that the relevant structure in the accused device perform the identical function recited in the claim and be

identical or equivalent to the corresponding structure in the " specification. *Frank's Casing*, 389 F.3d at 1378 [\*\*59] (quoting *Odetics, Inc. v. Storage Tech. Corp.*, 185 F.3d 1259, 1267 (Fed. Cir. 1999)). "Because structural equivalents under § 112, P6 are included within literal infringement of means-plus-function claims, 'the court must compare the accused structure with the disclosed structure, and must find equivalent structure as well as identity of claimed function for the structure. '" *Id.* (quoting *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 934 (Fed. Cir. 1987) (en banc) (emphasis omitted)). "This inquiry for equivalent structure under [\*1316] § 112, P6 examines whether 'the assertedly equivalent structure performs the claimed function in substantially the same way to achieve substantially the same result ....'" *Id.* (quoting *Odetics*, 185 F.3d at 1267).

At the outset, we conclude that Medtronic is not estopped from challenging interchangeability. In this case, Medtronic argued that a set screw and external nut are functionally equivalent for purposes of validating claim 10 of the '237 patent. However, that argument has no bearing on Medtronic's challenge to the interchangeability of a set screw and an external nut with respect [\*\*60] to claim 5 of the '555 patent because the functions of the "securing means" in claim 5 of the '555 patent and claim 10 of the '237 patent are different. Claim 10 does not require the application of substantially equal compressive forces to the rod on either side of the channel. See '237 patent, col. 4, ll. 42-58, ll. 61-63; col. 5, ll. 14-22. Because the positions are not entirely inconsistent, judicial estoppel does not apply. See *Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1345 (Fed. Cir. 2001) ("[A] party will be judicially estopped from asserting a position on appeal that is directly opposed to a position that the party successfully urged at trial." (internal citations omitted)).

As to the merits, the claimed function has two parts: (1) causing the rod to bear against the channel by applying a compressive force in the direction of the vertical axis; and (2) ensuring that substantially equal forces are applied along the longitudinal axis of the rod on opposite sides—either inside or outside—of the rod-receiving channel. There is no dispute that the set screw applies a compressive force in the direction of the vertical axis. However, [\*\*61] there is a genuine issue of material fact as to whether the set screw applies substantially equal forces on opposite sides of the channel, and thus whether there is identity of function.

On the one hand, Cross Medical cites testimony stating that the v-ring on the bottom of the internal set screws creates two points of contact when the set screws are compressed against the rod; that the two points of contact between the set screw and the rod are 180 degrees apart, separated by the drive in the set screw; and that the set screw is intended to be co-axial with the receiver (but because of manufacturing tolerances is not co-axial). (Sherman Dep. of Jan. 29, 2004, at 137-41; Sherman Dep. of Jan. 30, 2004, at 283-84.) On the other hand, Medtronic cites testimony stating that Sherman did not know if the load on the points of contact on either side of the v-ring were equal; that when the implant is functioning in a patient, the screw takes on additional load from the rod; and that anytime the screw is loaded, load will increase on one side of the plug such that forces on the two sides would be unequal. (*Id.* at 365-66.) Sherman further testified that he did not know if forces would be [\*\*62] equal before the screw and anchor seat were implanted, because manufacturing tolerances might impact the forces. (*Id.* at 366-67.) Drawing inferences in favor of Medtronic, a reasonable juror could find that the forces are not substantially equal on each side of the channel because of manufacturing tolerances and the additional load placed on the screw by the rod when implanted. Crediting Cross Medical's evidence, a reasonable juror could draw an inference based on Sherman's testimony that the forces applied to the rod on either side of the channel are substantially equal.

Moreover, there is a genuine issue of material fact as to whether the set screw accomplishes the claimed function in substantially the same way as the external nut. Medtronic has cited the testimony of [\*1317] Dr. Puno stating that he considered using a set screw in 1990 to hold the rod in place but decided against the set screw because of splaying concerns. (Puno Dep. of April 9, 2004, at 32, l. 10-36, l. 24.) Dr. Puno stated that having the side walls of the anchor seat spread apart when the screw was tightened down would be "a bad thing" and "could end up loosening the connection on the rod." (*Id.* at 35, ll. 7-14.) [\*\*63] Although Dr. Puno testified that he thought a set screw and external nut were interchangeable, he qualified his statement when confronted with prior deposition testimony to the opposite effect. (*Id.* at 37, l. 3-41, l. 23.) Dr. Villarraga stated that the structures were interchangeable because they both could compress a rod into a channel, and because other polyaxial devices utilized set screws. (Villarraga Decl. of April 12, 2004, at 2.) However, Dr.

Villarraga neither explained with any specificity why one of ordinary skill in the art at the time the '555 patent issued would believe the structures to be interchangeable, nor did she refer to any testing. (See *id.*) Drawing inferences in favor of Medtronic, a reasonable juror could find that the set screw does not compress the rod in substantially the same way based on Dr. Puno's testimony about the potential for splaying and his conscious decision to avoid the set-screw design. Drawing inferences in favor of Cross Medical, a reasonable juror could find that the set screw compresses the rod in substantially the same way because both employ threads as a compression mechanism, and some statements of Drs. Puno and Villarraga support [\*\*64] a finding of interchangeability.

We thus disagree with Medtronic that the equivalents question should be removed from the trier of fact under *Chiuminatta*. In that case, we held that no reasonable juror could conclude that the differences between "soft round wheels" and a "skid plate" were insubstantial. *Chiuminatta*, 145 F.3d at 1310. One of the many reasons that we found no equivalents as a matter of law was that the patent at issue discussed the use of wheels for another function, but never disclosed that wheels could perform the same function as the skid plate. *Id.* In this case, although Medtronic may argue that the fact finder should draw an inference of no interchangeability based on the inventors' explicit reference to set screws to form a cross-link, see '555 patent, col. 6, ll. 25-44, and their failure to explicitly recognize set screws as a means for securing the anchor to the bone, we must draw inferences in favor of Cross Medical in evaluating Medtronic's cross-motion for summary judgment. As discussed *supra*, we believe that the issue of interchangeability should be left for the trier of fact.

We also reject the other arguments that both [\*\*65] sides make in attempting to prevail on equivalents as a matter of law. First, we reject Cross Medical's argument that the '004 patent serves as an admission on interchangeability. Even though the '004 patent, which is assigned to an entity related to Medtronic, suggests that an "internally-threaded nut" is interchangeable with "a set screw or internal plug," '004 patent, col. 8, ll. 10-32, that patent issued in 2003 and is irrelevant to known interchangeability in 1995, when the '555 patent issued. See *Al-Site*, 174 F.3d at 1320 ("[A] structural equivalent under § 112 must have been available at the time of the issuance of the claim."). Second, we reject Medtronic's

contentions that the lack of "bowing" with the set screw and the evidence that the external nut does not function to cause "bowing" in Medtronic's device are relevant to interchangeability. Even if the external nut causes "bowing" in Medtronic's device, it is immaterial to the equivalents analysis because "prevention of bowing" is not a limitation of claim 5. See *Micro Chem.*, 194 F.3d at 1258 [\*1318] (cautioning against adopting a function different from that explicitly recited in the claim). [\*\*66] Furthermore, although Medtronic argues that the external nut may not work well in Medtronic's products, any impact this might have on the interchangeability analysis is undercut by a lack of evidentiary support.

In summary, we conclude that there is a genuine issue of material fact with respect to whether a set screw is equivalent to an external nut. Thus, the district court erred in deciding equivalents as a matter of law.

### 3. "bear against said channel"

Relying on its holding that the channel of the anchor seat could comprise more than one component, the district court ruled that, even if the crown is free-floating and not physically joined to the anchor seat because there is no lock between the crown and the screw, Medtronic's devices met the "bear against said channel" limitation as a matter of law. *Infringement Opinion*, 2004 U.S. Dist. LEXIS 14183, [W1] at 7-8. The district court considered evidence that the crown member is physically joined to the anchor seat because it cannot be removed without breaking the screw. *Id.* The district court analogized the crown in Medtronic's devices to a "pressure disk"--which was physically between the rod and the anchor seat--that the district court previously had [\*\*67] held met the "bear against the channel" limitation in *Cross Med. Prods. v. Depuy Acromed, Inc.*, 2002 U.S. Dist. LEXIS 27854, No. SA CV 00-576-GLT (ANx), (C.D. Cal. Feb. 11, 2002). *Infringement Opinion* at 7.

Medtronic argues that even if the anchor seat can be comprised of multiple components, as a matter of fact, the crown member in its accused devices is not part of the channel formed by the anchor seat and, thus, the rod does not bear against the channel as recited in the claim. Medtronic asserts that the crown is free floating and not physically or otherwise joined to the receiver; that the crown is either screwed or slid into the receiver; and that the crown is retained either by a snap ring or by interrupting the threads on the receiver after the crown is screwed into the receiver. Medtronic adds that the

presence of the crown between the rod and the bone screw causes the receiver member to become rigidly locked to the screw, which serves a different function than a channel absent a crown member.

Cross Medical counters that there is nothing to preclude a finding that the crown is part of the anchor seat. Cross Medical argues that the crown member is part of the channel formed by the anchor [\*68] seat because the crown is assembled into the device before it is sold, and cannot be removed without damaging the device. Cross Medical asserts that the crown is physically joined to the receiver, and adds that any difference in function is irrelevant because claim 5 has no functional limitation.

There is a genuine issue of material fact as to whether the "bear against [the] channel" limitation is met by the accused products. Sherman testified that in one product, "the crown member is threaded and screws down into the receiver member until it passes the threads of the receiver member and then floats freely until locked down by the rod." (Sherman Decl. of April 23, 2004, at 3.) Sherman stated that in other products, "the crown member is maintained in the receiver member by a snap ring that is designed to allow the crown 'member' to float or move freely within a limited range" before being locked down by the rod. (*Id.*) Sherman added that the rod touches only the crown member in each of Medtronic's products. (*Id.* at 3-4.) Viewing this evidence in the light most favorable to Medtronic, a reasonable juror could conclude that the rod bears only against the crown member, [\*1319] which [\*69] is separate from the channel in the anchor seat, and thus the rod does not "bear against" the channel of the anchor seat.

However, a reasonable juror could also find that the crown member is a part of the channel, and thus that the rod bears against the channel. Cross Medical cites to evidence that the screw, crown, snap ring, and receiver are assembled as one unit before the implant arrives to the surgeon. (Sherman Dep. of Jan. 29, 2004, at 123.) Cross Medical also cites evidence that the snap ring, which holds the crown member loosely in place, is damaged if the implant is disassembled. (*Id.* at 247.) And we agree with Cross Medical that the function served by the crown member is irrelevant to finding that this structural limitation is met. *See Amstar Corp. v. Envirotech Corp.*, 730 F.2d 1476, 1482 (Fed. Cir. 1984) ("Modifications by mere addition of elements of function ...cannot negate infringement ....").

Because there is a genuine issue of material fact as to whether the "bear against [the] channel" limitation is met, the district court erred in ruling that the accused devices met this limitation as a matter of law.

## E. Invalidity

The district court [\*70] granted Cross Medical's cross-motion for partial summary judgment on all invalidity defenses raised by Medtronic with respect to claim 5 of the '555 patent, including indefiniteness, anticipation, and obviousness. Medtronic appeals each of these rulings.

### 1. Indefiniteness

As noted in Part II. C. 3 *supra*, Medtronic argued that the district court erroneously interpreted the function of the "securing means" to require that equal forces be applied along the longitudinal axis of the channel on "either side" of the vertical axis. Medtronic asserted that the district court's interpretation would leave "said longitudinal axis" without a sufficient antecedent basis and render claim 5 indefinite. We construed the function of the "securing means" limitation as "to cause the rod to bear against the rod-receiving channel by applying a compressive force in the direction of the vertical axis, while ensuring that substantially equal forces are applied along the longitudinal axis of the rod on opposite sides--either inside or out side--of the rod-receiving channel." We agreed with Medtronic that the antecedent basis for "said longitudinal axis" was by implication the longitudinal axis of the [\*71] rod. *See Slimfold Mfg. Co. v. Kinkead Indus., Inc.*, 810 F.2d 1113, 1116 (Fed. Cir. 1987) (noting that an antecedent basis can be present by implication). Because the "said longitudinal axis" limitation is not lacking in antecedent basis, we conclude that the district court did not err in granting Cross Medical's motion for summary judgment that claim 5 is not indefinite.

### 2. Anticipation

The district court held that claim 5 was not anticipated as a matter of law because claim 5 covers only polyaxial screws and the two prior art references asserted to be anticipating--U.S. Patent No. 4,763,644 to Webb ("the '644 patent") and the "Bryd-Transpedicular Spinal Fixator"--disclose only monoaxial screws. *Invalidity Opinion*, 2004 U.S. Dist. LEXIS 27644, [WL] at 5. Medtronic's arguments on anticipation turn entirely

upon whether claim 5 covers monoaxial screws. Because we determined in Part II. C. 1 *supra* that claim 5 does not cover monoaxial screws, we conclude that the district court did not err in granting Cross Medical's motion for partial summary judgment that claim 5 is not anticipated.

### 3. Obviousness

In the district court, Medtronic contended that claim 5 was obvious in view of the '602 patent, [\*72] the '644 patent, and the [\*1320] Bryd device. *Invalidity Opinion*, 2004 U.S. Dist. LEXIS 27644, [WLJ] at 6. The parties agreed that the '602 and '644 patents were prior art, but the district court held that because Dr. Puno, an inventor on the '555 patent, also invented the closure mechanism of the Bryd device, the Bryd device was not prior art. 2004 U.S. Dist. LEXIS 27644, [WLJ] at 6. Focusing on the '602 and '644 patents, the district court explained that the '602 patent and the '555 patent are both polyaxial spinal implant devices. *Id.* The district court noted that "the only major difference between the '602 patent and the '555 is the '602 device is tightened from the bottom and the '555 is a top-loading nut," but that "the '644 patent covers a top-loading monoaxial spinal implant device." 2004 U.S. Dist. LEXIS 27644, [WLJ] at 7. However, the district court held that there was no motivation to combine the '602 and '644 references, relying on its prior ruling in *Cross Medical Products, Inc. v. DePuy AcroMed, Inc.*, 2003 U.S. Dist. LEXIS 26720, No. SA CV 00-876-GLT(ANx) (C.D. Cal. Jan. 9, 2003).

In *AcroMed*, the defendant had argued that "the top-loading nut would have been obvious in light of the problem to be solved, i.e., surgeons having difficulty tightening the bottom-loading nuts during [\*73] implantation." *Invalidity Opinion*, 2004 U.S. Dist. LEXIS 27644, [WLJ] at 7. The district court "found AcroMed failed to show motivation to combine because 'the problem was not discovered by looking at the prior art or the patent itself....It was only discovered when doctors tried to use the product.'" *Id.* The court cited *In re Sponnoble*, 56 C.C.P.A. 823, 405 F.2d 578, 585 (C.C.P.A. 1969), for the proposition that "'a patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is "' identified. *Invalidity Opinion*, 2004 U.S. Dist. LEXIS 27644, [WLJ] at 7.

The district court found that Medtronic offered no evidence that the problem was disclosed in the prior art. *Id.* The district court noted that "Defendants cite only the

'555 patent to describe the problem the '555 patent sought to fix." *Id.* The district court explained that "although Defendants argue the clinical investigators identified the problem with the bottom-loading nut, the investigators' letters are not prior art." *Id.* The district court acknowledged that "motivation to combine need not be explicit in the prior art; 'it can be implicit in the knowledge of one of skill in the [\*74] art,'" *id.* (quoting *Nat'l Steel Car, Ltd. v. Canadian Pac. Ry., Ltd.*, 357 F.3d 1319, 1337 (Fed. Cir. 2004)), but reasoned that "this rule does not change the result in this case because it does not relate to identification of the problem." 2004 U.S. Dist. LEXIS 27644, [WLJ] at 7. The district court then denied Medtronic's motion for summary judgment on obviousness and granted Cross Medical's cross motion. 2004 U.S. Dist. LEXIS 14183, [WLJ] at 7-8.

Medtronic argues that it presented sufficient evidence that the bottom-tightening-nut problem was known to those of ordinary skill in the art and that this provides a motivation to combine the '644 and '602 references. Medtronic cites communications from clinical investigators as evidence of recognition of the problem by those of ordinary skill in the art, and argues that the district court's analysis and adoption of the reasoning in *Sponnoble* were in error. In addition, Medtronic cites: (a) the '644 patent as evidence that bottom-tightening devices then available were problematic to assemble in situ; (b) U.S. Patent No. 5,261,913 ("the '913 patent") as evidence that it was within the knowledge of one of ordinary skill to use a top-tightening nut; and (c) the '555 patent [\*75] as evidence that prior art polyaxial screws designed with bottom-tightening nuts were awkward.<sup>3</sup> Medtronic argues that even if [\*1321] the '913 patent does not qualify as prior art, it evidences knowledge of one of ordinary skill in the art. Medtronic asserts that, at the least, this evidence is enough to create a genuine issue of material fact on motivation to combine.

3 In a footnote in its opening brief, Medtronic asserts that the district court erroneously resolved a fact question as to whether Dr. Puno was an inventor of the Bryd device but never requests relief or provides record cites for its assertions. Medtronic makes no other reference to the Bryd device with respect to obviousness in its opening brief. In its response brief, Medtronic asserts that even if Dr. Puno is a joint inventor of the Bryd device, there is a different set of joint inventors on the Bryd device--Drs. Puno and Bryd--than on the

'555 patent--Dr. Puno and Mellinger. Medtronic argues that the two sets of inventors are separate legal entities under *In re Kaplan*, 789 F.2d 1574, 1575 (Fed. Cir. 1986), and that the Bryd device may be prior art under §§ 102(f) and 103. Medtronic adds that even if the Bryd device is confidential, it evidences knowledge of those of ordinary skill.

Medtronic has not properly raised the inventorship issue in its opening brief to warrant relief from this court. See *Fuji Photo Film Co. v. Jazz Photo Corp.*, 394 F.3d 1368, 1375 n.4 (Fed. Cir. 2005) (holding that this court will not address arguments that are not properly raised in the opening brief). Nor will this court consider Medtronic's new arguments raised for the first time in its reply brief. *Id.*

[\*\*76] Cross Medical counters that Dr. Puno was one of the clinical investigators who recognized the problem with the '602 device, that Dr. Puno discovered the problem as part of his inventive process, and thus that the clinical investigators' recognition of the problem is not evidence of a motivation to combine. Cross Medical argues that the '644 patent does not itself provide reason to apply its teachings to modify the '602 device because it discusses prior art assembly problems related to use of a locking nut and threaded rod to hold the screw. Cross Medical argues that the '602 device did not use a threaded rod with a locking nut, and thus the inventors did not confront the same problem as confronted by the inventors of the '644 device. Cross Medical asserts that the '913 patent cannot evidence knowledge of ordinary skill in the art at the time of the invention because the application that matured into the '913 patent was filed two months after the invention date of the '555 patent, and that application was not published for 18 months. Cross Medical cites differences between the '602 and '555 patents in addition to the bottom-tightening nut, and asserts that Medtronic submitted no evidence [\*\*77] explaining how the particular structural elements of the '602 device could be modified to achieve the structure disclosed in claim 5 as a whole. Cross Medical argues that Medtronic failed to discuss "trade-offs" to the use of the top-tightening device, and neglected to discuss secondary considerations.

"A claimed invention is unpatentable if the differences between it and the prior art are such that the

subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." *In re Kotzab*, 217 F.3d 1365, 1369 (Fed. Cir. 2000); see 35 U.S.C. § 103. An invention may be a combination of old elements disclosed in multiple prior art references. *Kotzab*, 217 F.3d at 1369. In determining whether a combination of old elements is non-obvious, the court must assess whether, in fact, an artisan of ordinary skill in the art at the time of invention, with no knowledge of the claimed invention, would have some motivation to combine the teachings of one reference with the teachings of another reference. See *In re Fulton*, 391 F.3d 1195, 1200-02 (Fed. Cir. 2004). Motivation [\*\*78] to combine references "may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or, in some cases the nature of the problem to be solved." *Kotzab*, 217 F.3d at 1370. "The test for an implicit teaching is what the combined references, knowledge of one of ordinary skill [\*\*1322] in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." *Id.*

The sole issue before us is whether the district court erred in ruling that there is no genuine issue of material fact as to whether the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time of the invention based on the absence of any evidence of a motivation to combine the '602 and '644 references. We conclude that a genuine issue of material fact exists with respect to motivation to combine. Cross Medical designated the screw disclosed in the '602 patent as the "PWB I" and performed a pilot study testing its use in humans. A paper, entitled "The Puno-Winter-Bird (PWB) Spinal System for Transpedicular Fixation of the Lumbar Spine," recounted that surgeons participating in the [\*\*79] pilot study found the implant design "tedious," and that it was "technically difficult to position the wrench when the nut was tightened, since it required that the nut be advanced from under the rod." The paper explained that "although [the PWB I] provided satisfactory fixation of the rod, the design was not 'user' friendly. The paper noted that "[a] design improvement was in order and led to the development of the PWB II." Other evidence in the record confirms that surgeons in the pilot study recognized the problem and requested changes. The surgeons who participated in the pilot included investigators other than inventors of the '555 patent.

From this evidence, a reasonable juror could conclude that at the time of the invention, one of ordinary skill in the art could have been motivated to modify the PWB in light of the problem to be solved. Giving credit to Medtronic's evidence, the clinical investigators recognized the bottom-tightening problem with the '602 device and proposed changes. The problem was within the general knowledge of those of ordinary skill in the art, and thus provided sufficient motivation to navigate the prior art in the spinal implant field in search [\*\*80] of a teaching on how one might modify the '602 device away from a bottom-tightening assembly.

The district court erred in discounting the clinical investigators' recognition of the problem. "It has long been the law that the motivation to combine need not be found in prior art references, but equally can be found 'in the knowledge generally available to one of ordinary skill in the " art. *Nat'l Steel*, 357 F.3d at 1337 (quoting *In re Jones*, 958 F.2d 347, 351 (Fed. Cir. 1992)). Evidence of a motivation to combine references need not be in the form of prior art. *See id.* at 1338-39. Evidence that a person of ordinary skill in the art recognized the same problem to be solved as the inventor and suggested a solution is, at the least, probative of a person of ordinary skill in the art's willingness to search the prior art in the same field for a suggestion on how to solve that problem. *See Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573 (Fed. Cir. 1996) (Motivation to combine "may also come from the nature of a problem to be solved, leading inventors to look to references relating to possible solutions to that [\*\*81] problem." (citing *Application of Rinehart*, 531 F.2d 1048, 1054 (C.C.P.A. 1976)); *In re Huang*, 100 F.3d 135, 139 n.5 (Fed. Cir. 1996) (stating that problem well-known to a person of ordinary skill in the art would have directed that person of ordinary skill to the reference teaching the missing elements); *see also, e.g.*, *In re Gartside*, 203 F.3d 1305, 1320-21 (Fed. Cir. 2000) (recognizing that motivation to combine can come from the nature of the problem to be solved); *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998) (same)). To the extent that the district court determined [\*1323] that the only investigators who recognized the problem of the bottom-tightening assembly were inventors on the '555 patent, that conclusion has no basis in the record.

Furthermore, the district court's reliance on *Sponnoble* is misplaced. In that case, those of ordinary skill in the art of packaging pharmaceutical products

recognized a moisture-transfer problem with "structure[s] for temporarily isolating a compartment containing a solid pharmaceutical product from a compartment containing an aqueous solution." *Sponnoble*, 405 F.2d at 585, [\*\*82] The industry believed that moisture was transmitted *around* the plug separating the two compartments. *Id.* at 586. Sponnoble discovered that moisture traveled *through* the plug and remedied that problem with a solution available in the prior art. *Id.* Our predecessor court held that the invention was non-obvious because one of ordinary skill in the art would not have chosen the solution without recognizing the true cause of the problem, and "the cause of the problem [was] not suggested by the prior art." *Id.* In this case, however, the problem was known to the clinical investigators at the time of the invention, and thus, unlike *Sponnoble*, the problem was within the general knowledge of one of ordinary skill in the art. *See Nat'l Steel*, 357 F.3d at 1338 ("Something that has already been rendered obvious to a newcomer in the field is probative of what would be obvious to someone who has been around for a longer period of time."). If the problem is within the knowledge of one of ordinary skill in the art, then it is irrelevant that the prior art does not disclose the problem. *See id.* at 1337-39.

Moreover, we conclude--after drawing [\*\*83] inferences in favor of Medtronic--that the '644 patent itself may have provided sufficient motivation for one of ordinary skill to have considered its teachings and altered the '602 device. The '644 invention was an improvement over prior art spinal implant devices which used a threaded rod with locking nuts. In characterizing the prior art, the patent states that "the need to thread the nut along the rod results in the device being rather slow to assemble and can result in damage to soft tissue if carried out in situ." '644 patent, col. 2, ll. 10-12. The solution was, in part, a top-tightening nut. *See id.*, col. 3, ll. 16-23; *id.*, Figure 2. Thus, the '644 patent discusses a problem posed by the assembly of certain spinal stabilization devices in situ and a solution. Confronted with the implantation problem of the '602 device, one of ordinary skill might have found the problem solved by the '644 patent sufficiently analogous to have been motivated to apply its teachings. In turn, we reject Cross Medical's contention that the '644 device cannot provide the requisite motivation because the problem it addressed may have differed slightly from the problem encountered by surgeons [\*\*84] using the '602 device. One of ordinary skill in the art need not see the identical problem

addressed in a prior art reference to be motivated to apply its teachings. *See In re Oetiker*, 977 F.2d 1443, 1448 (Fed. Cir.1992) (Nies, C.J., concurring) ("Such suggestion or motivation to combine prior art teachings can derive solely from the existence of a teaching, which one of ordinary skill in the art would be presumed to know, and the use of that teaching to solve *the same or similar problem* which it addresses." (citing *In re Wood*, 599 F.2d 1032, 1037 (C.C.P.A. 1979)) (emphasis added)); *cf. In re Dillon*, 919 F.2d 688, 694 (Fed. Cir.1990) (en banc) ("[A] reference is not from a non-analogous art if] the reference is reasonably pertinent to the particular problem with which the inventor was " involved. (quoting *In re Deminski*, 796 F.2d 436, 442 (Fed. Cir. 1986) (quoting in turn from *Wood*, 599 F.2d at 1036)).

[\*1324] As to the other evidence cited by Medtronic, the '555 patent suggests that the inventor recognized the problem of bottom-tightening. However, the patent does not provide evidence that the [\*85] problem was within the knowledge of those of ordinary skill in the art at the time of the invention; or that the problem was disclosed in the prior art. The '913 patent is also of limited relevance because it issued after the invention date. *See Mahurkar v. C.R. Bard, Inc.*, 79 F.3d 1572, 1576-77 (Fed. Cir. 1996).

Thus, we conclude that, because there are genuine issues of material fact on the underlying facts related to obviousness, the grant of summary judgment was in

error.

### III. CONCLUSION

We conclude that we have jurisdiction over this appeal. We affirm the district court's construction of the "anchoring means," "securing means," and "bear against said channel" limitations, but modify the district court's construction of the "operatively joined" and the "anchor seat means" limitations. Because we find genuine issues of material fact regarding infringement, we reverse the grant of Cross Medical's motion for partial summary judgment of infringement and find no abuse of discretion in the denial of Medtronic's cross-motion for partial summary judgment of non-infringement. We also reverse the grant of Cross Medical's motion for partial summary judgment that claim [\*86] 5 is not obvious but affirm the grant of that motion as to indefiniteness and anticipation. We further conclude that the district court did not abuse its discretion in denying Medtronic's cross-motion for summary judgment as to these invalidity issues. As a result, we vacate the permanent injunction. We remand for further proceedings consistent with this opinion.

*AFFIRMED-IN-PART, REVERSED-IN-PART,  
VACATED-IN-PART, AND REMANDED.*

### COSTS

Costs to Medtronic.

LEXSEE 425 U.S. 219

DANN, COMMISSIONER OF PATENTS AND TRADEMARKS v. JOHNSTON

No. 74-1033

SUPREME COURT OF THE UNITED STATES

425 U.S. 219; 96 S. Ct. 1393; 47 L. Ed. 2d 692; 1976 U.S. LEXIS 95; 189 U.S.P.Q. (BNA) 257

Argued December 9, 1975  
March 31, 1976

**PRIOR HISTORY:** CERTIORARI TO THE  
UNITED STATES COURT OF CUSTOMS AND  
PATENT APPEALS

automatic data processing system for use in a large  
business organization to record information as to  
transactions in each department of the organization.

Blackmun and Stevens, JJ., did not participate.

**SUMMARY:**

A patent was sought for a computer system for automatic record keeping of bank checks and deposits, permitting a bank--by using machine readable checks and deposit slips, bearing numerical category codes for various types of expenditures and sources of deposited funds--to furnish a customer with subtotals for each category of transactions conducted through the customer's single bank account. Both a patent examiner and the Patent and Trademark Office Board of Appeals rejected the patent application on various grounds, including obviousness under 103 of the Patent Act (35 USCS 103), which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the applicable art. The United States Court of Customs and Patent Appeals reversed the Board's decision, holding that the patent applicant's system was not obvious under prior art (502 F2d 765).

On certiorari, the United States Supreme Court reversed and remanded. In an opinion by Marshall, J., expressing the unanimous view of the seven participating members of the court, it was held that the applicant's computer system was unpatentable under 103 of the Patent Act as being obvious to one reasonably skilled in the applicable art, in view of the prior art with regard to (1) the nature of the current use of data processing equipment and computer programs in the banking industry, and (2) an earlier patent to another person for an automatic data processing system for use in a large business organization to record detailed information as to transactions in each department of the organization.

**LAWYERS' EDITION HEADNOTES:**

[\*\*\*LEdHN1]

PATENTS §19.1

obviousness -- computer system for banks --

Headnote:[1A][1B][1C]

A computer system for automatic record keeping of bank checks and deposits, permitting a bank--by using machine readable checks and deposit slips bearing numerical category codes for various types of expenditures and sources of deposited funds--to furnish a customer with subtotals for each category of transactions conducted through the customer's single bank account, is unpatentable under 103 of the Patent Act (35 USCS 103) as being obvious to one reasonably skilled in the applicable art, in view of the prior art with regard to (1) the nature of the current use of data processing equipment and computer programs in the banking industry, and (2) an earlier patent to another person for an automatic data processing system for use in a large business organization to record detailed information as to transactions in each department of the organization.

[\*\*\*LEdHN2]

PATENTS §19.1

425 U.S. 219, \*, 96 S. Ct. 1393, \*\*;  
47 L. Ed. 2d 692, \*\*\*LEdHN2; 1976 U.S. LEXIS 95

obviousness -- relevant factors --

Headnote:[2]

Under 103 of the Patent Act (*35 USCS 103*)--which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the applicable art--the central factors relevant to any inquiry into obviousness are (1) the scope and content of the prior art, (2) the differences between the prior art and the claims at issue, and (3) the level of ordinary skill in the pertinent art.

[\*\*\*LEdHN3]

PATENTS §19.1

obviousness -- prior art --

Headnote:[3]

Under 103 of the Patent Act (*35 USCS 103*)--which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the applicable art--the "obviousness" test is not one which turns on whether an invention is equivalent to some element in the prior art but rather whether the difference between the prior art and the subject matter in question is sufficient to render the claimed subject matter unobvious to one skilled in the applicable art.

[\*\*\*LEdHN4]

PATENTS §19.1

obviousness -- person skilled in art --

Headnote:[4]

In making a determination of "obviousness" under 103 of the Patent Act (*35 USCS 103*)--which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the applicable art--the criteria is measured not in terms of what would be obvious to a layman, but rather what would be obvious to one reasonably skilled in the applicable art.

[\*\*\*LEdHN5]

PATENTS §19.1

obviousness -- prior art --

Headnote:[5]

The mere existence of differences between the prior art and an invention does not establish the invention's nonobviousness for purposes of 103 of the Patent Act (*35 USCS 103*), which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the applicable art.

[\*\*\*LEdHN6]

PATENTS §18

commercial success -- obviousness --

Headnote:[6A][6B]

Although commercial success without invention will not make patentability, nevertheless secondary considerations such as commercial success, long felt but unsolved needs, and failure of others may be relevant in a determination of obviousness under 103 of the Patent Act (*35 USCS 103*), which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the art.

## SYLLABUS

Respondent's "machine system for automatic record-keeping of Sbank checks and deposits," under which checks and deposits are customer-labeled with code categories which are "read," and then processed by a data processor, such as a programmable electronic digital computer, having data storage files and a control system, permitting a bank to furnish a customer with an individual and categorized breakdown of his transactions during the period in question, *held* unpatentable on grounds of obviousness. *35 U.S.C. § 103*. Pp. 225-230.I

*502 F. 2d 765, reversed and remanded.*

MARSHALL, J., delivered the opinion of the Court, in which all Members joined except BLACKMUN and STEVENS, J.J., who took no part in the consideration or decision of the case.

COUNSEL: *Howard E. Shapiro* argued the cause for petitioner. With him on the brief were *Solicitor General*

425 U.S. 219, \*, 96 S. Ct. 1393, \*\*;  
47 L. Ed. 2d 692, \*\*\*; 1976 U.S. LEXIS 95

*Bork, Assistant Attorney General Kauper, Gerald P. Norton, Richard H. Stern, and Karl E. Bakke.*

*Morton C. Jacobs* argued the cause and filed a brief for respondent. \*

\* *John S. Voorhees* and *Kenneth E. Krosin* filed a brief for the Computer & Business Equipment Manufacturers Assn. as *amicus curiae* urging reversal.

Briefs of *amicus curiae* urging affirmance were filed by *Carol A. Cohen* for Applied Data Research, Inc.; by *David Cohen* for the Association of Data Processing Service Organizations, Software Industry Assn.; and by *Charles Winn Sims* and *Francis Noel Carten* for Universal Software, Inc.

Briefs of *amicus curiae* were filed by *Richard E. Kurtz*, *Jack C. Goldstein*, and *Arthur R. Whale* for the American Patent Law Assn.; by *Reed C. Lawlor*, *Theodore H. Lassagne*, *David E. Lovejoy*, and *John P. Sutton* for the California Patent Law Assn.; by *James W. Gerick* and *John C. Dorfman* for the Los Angeles and Philadelphia Patent Law Assns.; and by *Mr. Lawlor* for Software Associates, Inc.

**JUDGES:** BURGER, BRENNAN, STEWART, WHITE, MARSHALL, POWELL, REHNQUIST; BLACKMUN AND STEVENS took no part in the consideration or decision of the case.

#### OPINION BY: MARSHALL

#### OPINION

[\*220] [\*\*\*694] [\*\*1394] MR. JUSTICE MARSHALL delivered the opinion of the Court.

Respondent has applied for a patent on what is described in his patent application as a "machine system for automatic record-keeping of bank checks and deposits." The system permits a bank to furnish a customer with subtotals of various categories of transactions completed in connection with the customer's single account, thus saving the customer the time and/or expense of conducting this bookkeeping himself. As respondent has noted, the "invention is being sold as a computer program to banks and to other data processing

companies so that they can perform these data processing services for depositors." Brief for Respondent 19A; *Application of Johnston*, 502 F. 2d 765 (CCPA 1974).

[\*\*\*695] [\*\*\*LEdHR1A] [1A]Petitioner and respondent, as well as various *amici*, have presented lengthy arguments addressed to the question of the general patentability of computer programs. Cf. *Gottschalk v. Benson*, 409 U.S. 63 (1972). We find no need to treat that question in this case, however, because we conclude that in any event respondent's system is unpatentable on grounds of obviousness. 35 U.S.C. § 103. Since the United States Court of Customs and Patent Appeals (CCPA) found respondent's system to be patentable, *Application of Johnston, supra*, the decision of that court is accordingly reversed.

#### I

While respondent's patent application pertains to the highly esoteric field of computer technology, [\*221] the basic functioning of his invention is not difficult to comprehend. Under respondent's system a bank customer labels each check that he writes with a numerical category code corresponding to the purpose for which the funds are being expended. For instance, "food expenditures" might be a category coded "123," "fuel expenditures" a category coded "124," [\*\*1395] and "rent" still another category coded "125." Similarly, on each deposit slip, the customer, again through a category code, indicates the source of the funds that he is depositing. When the checks and deposit slips are processed by the bank, the category codes are entered upon them in magnetic ink characters, just as, under existing procedures, the amount of the check or deposit is entered in such characters. Entries in magnetic ink allow the information associated with them to be "read" by special document-reading devices and then processed by data processors. On being read by such a device, the coded records of the customer's transactions are electronically stored in what respondent terms a "transaction file." Respondent's application describes the steps from this point as follows: "To process the transaction file, the... system employs a data processor, such as a programmable electronic digital computer, having certain data storage files and a control system. In addition to the transaction file, a master record-keeping file is used to store all of the records required for each

425 U.S. 219, \*221; 96 S. Ct. 1393, \*\*1395,  
47 L. Ed. 2d 692, \*\*LEdHR1A; 1976 U.S. LEXIS 95

customer in accordance with the customer's own chart of accounts. The latter is individually designed to the customer's needs and also constructed to cooperate with the control system in the processing of the customer's transactions. The control system directs the generation of periodic output [\*222] reports for the customer which present the customer's transaction records in accordance with his own chart of accounts and desired accounting procedures." Pet. for Cert. 4A-5A.I

Thus, when the time comes for the bank customer's regular periodic statement to be rendered, the programmed computer sorts out the entries in the various categories and produces a statement which groups the entries according to category and which gives subtotals for each category. The customer can then quickly see how much he spent or received in any given category during the period in question. Moreover, according to respondent, the system can "[adapt] to whatever variations [\*696] in ledger format a user may specify." Brief for Respondent 66.

In further description of the control system that is used in the invention, respondent's application recites that it is made up of a general control and a master control. The general control directs the processing operations common to most customers and is in the form of a software computer program, *i.e.*, a program that is meant to be used in a general-purpose digital computer. The master control, directing the operations that vary on an individual basis with each customer, is in the form of a separate sequence of records for each customer containing suitable machine-instruction mechanisms along with the customer's financial data. Respondent's application sets out a flow chart of a program compatible with an IBM 1400 computer which would effectuate his system.

Under respondent's invention, then, a general purpose computer is programmed to provide bank customers with an individualized and categorized breakdown of their transactions during the period in question.

[\*223] II After reviewing respondent's patent application, the patent examiner rejected all the claims therein. He found that respondent's claims were invalid as being anticipated by the prior art, 35 U.S.C. § 102, and as not "particularly pointing out and distinctly claiming" what respondent was urging to be his invention. § 112.

Respondent appealed to the Patent and Trademark Office Board of Appeals. The Board rejected respondent's application on several grounds. It found first that under § 112, the application was indefinite and did not distinctly enough claim what respondent was urging to be his invention. It also concluded that respondent's claims were invalid under § 101 because they claimed nonstatutory subject matter. According to the Board, computer-related inventions which extend "beyond the field of technology... are nonstatutory." Pet. for Cert. 31A. See *Application of Foster*, 58 C.C.P.A. (Pat.) 1001, 1004, [\*\*1396] 435 F. 2d 1011, 1015 (1971); *Application of Musgrave*, 57 C.C.P.A. (Pat.) 1352, 431 F. 2d 882 (1970), and respondent's claims were viewed to be "non-technological." Finally, respondent's claims were rejected on grounds of obviousness. 35 U.S.C. § 103. The Board found that respondent's claims were obvious variations of established uses of digital computers in banking and obvious variations of an invention, developed for use in business organizations, that had already been patented. *Dirks*, U.S. Patent No. 3,343,133.

The CCPA, in a 3-2 ruling, reversed the decision of the Board and held respondent's invention to be patentable. The court began by distinguishing its view of respondent's invention as a "record-keeping machine system for financial accounts" from the Board's rather negative view of the claims as going solely to the "relationship of [\*224] a bank and its customers." 502 F. 2d, at 770 (emphasis in CCPA opinion). As such, the CCPA held, respondent's system was "clearly within the 'technological arts,'" *id.*, at 771, and was therefore statutory subject matter under 35 [\*\*\*697] U.S.C. § 101. Moreover, the court held that respondent's claims were narrowly enough drawn and sufficiently detailed to pass muster under the definiteness requirements of § 112. Dealing with the final area of the Board's rejection, the CCPA found that neither established banking practice nor the *Dirks* patent rendered respondent's system "obvious to one of ordinary skill in the art who did not have [respondent's] specification before him." 502 F. 2d, at 772.

In order to hold respondent's invention to be patentable, the CCPA also found it necessary to distinguish this Court's decision in *Gottschalk v. Benson*, 409 U.S. 63 (1972), handed down some 13 months subsequent to the Board's ruling in the instant case. In *Benson*, the respondent sought to patent as a "new and

425 U.S. 219, \*224; 96 S. Ct. 1393, \*\*1396;  
47 L. Ed. 2d 692, \*\*\*697; 1976 U.S. LEXIS 95

useful process," 35 U.S.C. § 101, "a method of programming a general-purpose digital computer to convert signals from binary-coded decimal form into pure binary form." 409 U.S., at 65. As we observed: The claims were not limited to any particular art or technology, to any particular apparatus or machinery, or to any particular end use." *Id.*, at 64. Our limited holding, *id.*, at 71, was that respondent's method was not a patentable "process" as that term is defined in 35 U.S.C. § 100 (b).<sup>1</sup>

1 "The term 'process' means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material." 35 U.S.C. § 100 (b).

The Solicitor of the Patent Office argued before the CCPA that *Benson's* holding of nonpatentability as to the computer program in that case was controlling here. [\*225] However, the CCPA concluded that while *Benson* involved a claim as to the patentability of a "process," respondent in this case was advancing claims as to the patentability of an "apparatus" or "machine" which did not involve discoveries so abstract as to be unpatentable: "The issue considered by the Supreme Court in *Benson* was a narrow one, namely, is a formula for converting binary coded decimal numerals into pure binary numerals by a series of mathematical calculations a patentable process?" (Emphasis added.)] [Quoting *In re Christensen*, 478 F. 2d 1392, 1394 (CCPA 1973).

"[T]he instant claims in *apparatus* form do not claim or encompass a law of nature, a mathematical formula, or an algorithm." 502 F. 2d, at 771 (emphasis in CCPA opinion). Having disposed of the Board's rejections and having distinguished *Benson* to its satisfaction, the court held respondent's invention to be patentable. The Commissioner of Patents sought review in this Court and we granted certiorari. 421 U.S. 962 (1975). We hold that respondent's invention was obvious under 35 U.S.C. § 103 and therefore reverse.

### III

As a judicial test, "invention" - i.e., "an exercise of the inventive faculty," [\*1397] "McClain v. Ortmayer, 141 U.S. 419, 427 (1891) - has long been regarded as [\*\*\*698] an absolute prerequisite to patentability. See, e.g., *Keystone Driller Co. v. Northwest Engineering Corp.*, 294 U.S. 42 (1935); *Sharp v. Stamping Co.*, 103 U.S. 250 (1880); *Hotchkiss v. Greenwood*, 11 How. 248

(1851). However, it was only in 1952 that Congress, in the interest of "uniformity and definiteness," articulated the requirement in a statute, [\*226] framing it as a requirement of "nonobviousness." <sup>2</sup> Section 103 of the Patent Act of 1952, 35 U.S.C. § 103, provides in full: "A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made."

2 S. Rep. No. 1979, 82d Cong., 2d Sess., 6 (1952); H.R. Rep. No. 1923, 82d Cong., 2d Sess., 7 (1952).

[\*\*\*LEdHR2] [2]This Court treated the scope of § 103 in detail in *Graham v. John Deere Co.*, 383 U.S. 1 (1966). There, we held that § 103 "was not intended by Congress to change the general level of patentable invention," but was meant "merely as a codification of judicial precedents... with congressional directions that inquiries into the obviousness of the subject matter sought to be patented are a prerequisite to patentability." *Id.*, at 17. While recognizing the inevitability of difficulty in making the determination in some cases, we also set out in *Graham, supra*, the central factors relevant to any inquiry into obviousness: "the scope and content of the prior art," "the "differences between the prior art and the claims at issue," and "the level of ordinary skill in the pertinent art." *Ibid.* Guided by these factors, we proceed to an inquiry into the obviousness of respondent's

[\*\*\*LEdHR1B] [1B]system.

As noted, *supra*, at 223, the Patent and Trademark Office Board of Appeals relied on two elements in the prior art in reaching its conclusion that respondent's [\*227] system was obvious. We find both to be highly significant. The first was the nature of the current use of data processing equipment and computer programs in the banking industry. As respondent's application itself observes, that use is extensive: S

"Automatic data processing equipments employing digital computers have been developed for the handling

425 U.S. 219, \*227; 96 S. Ct. 1393, \*\*1397;  
47 L. Ed. 2d 692, \*\*LEdHR1B; 1976 U.S. LEXIS 95

of much of the record-keeping operations involved in a banking system. The checks and deposit slips are automatically processed by forming those items as machine-readable records... With such machine systems, most of the extensive data handling required in a bank can be performed automatically." Pet. for Cert. 3A.I

It is through the use of such data processing equipment that periodic statements are ordinarily given to a bank customer on each of the several accounts that he may have at a [\*\*\*699] given bank. Under respondent's system, what might previously have been separate accounts are treated as a single account, and the customer can see on a single statement the status and progress of each of his "subaccounts." Respondent's "category code" scheme, see *supra* at 221, is, we think, closely analogous to a bank's offering its customers multiple accounts from which to choose for making a deposit or writing a check. Indeed, as noted by the Board, the addition of a category number, varying with the nature of the transaction, to the end of a bank customer's regular account number, creates "in effect, a series [\*\*1398] of different and distinct account numbers...." Pet. for Cert. 34A. Moreover, we note that banks have long segregated debits attributable to service charges *within* any given separate account and have rendered their customers subtotals for those charges.

[\*\*\*LEdHR3] [3]The utilization of automatic data processing equipment in the traditional separate account system is, of course, [\*228] somewhat different from the system encompassed by respondent's invention. As the CCPA noted, respondent's invention does something other than "provide a customer with... a summary sheet consisting of net totals of plural separate accounts which a customer may have at a bank." 502 F. 2d, at 771. However, it must be remembered that the "obviousness" test of § 103 is not one which turns on whether an invention is equivalent to some element in the prior art but rather whether the difference between the prior art and the subject matter in question "is a difference sufficient to render the claimed subject matter unobvious to one skilled in the applicable art...." *Id.*, at 772 (Markey, C.J., dissenting).

[\*\*\*LEdHR1C] [1C] There is no need to make the obviousness determination in this case turn solely on the nature of the current use of data processing and computer programming in the banking industry. For, as noted, the Board pointed to a second factor - a patent issued to

Gerhard Dirks - which also supports a conclusion of obviousness. The Dirks patent discloses a complex automatic data processing system using a programmed digital computer for use in a large business organization. Under the system transaction and balance files can be kept and updated for each department of the organization. The Dirks system allows a breakdown within each department of various areas, e.g., of different types of expenses. Moreover, the system is sufficiently flexible to provide additional breakdowns of "sub-areas" within the areas and can record and store specially designated information regarding each of any department's transactions. Thus, for instance, under the Dirks system the disbursing office of a corporation can continually be kept apprised of the precise level and nature of the corporation's disbursements within various areas or, as the Dirks patent terms them, "Item Groups."

[\*229] Again, as was the case with the prior art within the banking industry the Dirks invention is not equivalent to respondent's system. However, the departments of the business organization and the areas or "Item Groups" under the Dirks system are closely analogous to the bank customers and category number designations respectively under respondent's system. And each [\*\*\*700] shares a similar capacity to provide breakdowns within its "Item Groups" or category numbers. While the Dirks invention is not designed specifically for application to the banking industry many of its characteristics and capabilities are similar to those of respondent's system. Cf. *Graham*, 383 U.S., at 35.

[\*\*\*LEdHR4] [4]In making the determination of "obviousness," it is important to remember that the criterion is measured not in terms of what would be obvious to a layman, but rather what would be obvious to one "reasonably skilled in [the applicable] art." *Id.*, at 37. In the context of the subject matter of the instant case, it can be assumed that such a hypothetical person would have been aware both of the nature of the extensive use of data processing systems in the banking industry and of the system encompassed in the Dirks patent. While computer technology is an exploding one, "[i]t is but an evenhanded application to require that those persons granted the benefit of a patent monopoly be charged with an awareness" of that technology. *Id.*, at 19.

[\*\*\*LEdHR5] [5] [\*\*\*LEdHR6A] [6A]Assuming such an awareness, respondent's system would, we think, have been obvious to one "reasonably skilled in [the

425 U.S. 219, \*229; 96 S. Ct. 1393, \*\*1398;  
 47 L. Ed. 2d 692, \*\*\*LEDHR6A; 1976 U.S. LEXIS 95

applicable] art." There may be differences between respondent's invention and [\*\*1399] the state of the prior art. Respondent makes much of his system's ability to allow "a large number of small users to get the benefit of large-scale electronic computer equipment and still continue to use their individual ledger format and [\*230] bookkeeping methods." Brief for Respondent 65. It may be that that ability is not possessed to the same extent either by existing machine systems in the banking industry or by the Dirks system.<sup>3</sup> But the mere existence of differences between the prior art and an invention does not establish the invention's nonobviousness. The gap between the prior art and respondent's system is simply not so great as to render the system nonobvious to one reasonably skilled in the art.<sup>4</sup>

[\*\*\*LEDHR6B] [6B]

3 The Dirks patent does allow "the departments or other organizational users [i.e., the analogues to bank customers under respondent's invention, to] retain their authority over operative file systems" and indicates that "[p]rogramming is very easy and different programs are very easily coordinated."

4 While "commercial success without invention will not make patentability," *A&P Tea Co. v. Supermarket Corp.*, 340 U.S. 147, 153 (1950), we did indicate in *Graham v. John Deere Co.*, 383 U.S. 1 (1966), that "secondary considerations [such] as commercial success, long felt but unsolved needs, [and] failure of others" may be relevant in a determination of obviousness. *Id.*, at 17. Respondent does not contend nor can we conclude that any of these secondary considerations offer any substantial support for

his claims of nonobviousness.

Accordingly, we reverse the Court of Customs and Patent Appeals and remand this case to that court for further proceedings consistent with this opinion.

*So ordered.*

MR. JUSTICE BLACKMUN and MR. JUSTICE STEVENS took no part in the consideration or decision of this case.

#### REFERENCES

*60 Am Jur 2d, Patents 53-86*

19 Am Jur PI & Pr Forms (Rev ed), Patents, Forms 1-6

14 Am Jur Legal Forms 2d, Patents 196:11 et seq.

35 USCS 103

US L Ed Digest, Patents 19.1

ALR Digests, Patents 7

L Ed Index to Annos, Computers; Patents

ALR Quick Index, Computers; Patents

Federal Quick Index, Computers; Patents

#### Annotation References:

Application and effect of 35 USCS 103, requiring nonobvious subject matter, in determining validity of patents. 23 ALR Fed 326.

Patentability of computer programs. 6 ALR Fed 156.

LEXSEE 910 F.2D 831

IN RE RAYMOND G. BOND

No. 90-1023

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

*910 F.2d 831; 1990 U.S. App. LEXIS 13087; 15 U.S.P.Q.2D (BNA) 1566*

August 3, 1990, Decided

**SUBSEQUENT HISTORY:** [\*\*1] As Corrected August 10, 1990. Rehearing Denied November 1, 1990. Reported at: *1990 U.S. App. LEXIS 19971*.

I

**PRIOR HISTORY:**Appealed from U.S. Patent & Trademark Office Board of Patent Appeals & Interferences.

The application involves one of the [\*\*2] remote control features of a telephone answering machine, the remote turn-on feature. The machine owner who forgot to set the machine to answer (e.g., it was set to play back messages) can call the machine and set it to answering mode remotely by ringing the phone a certain number of times. Once the machine is set, it will remain in this mode and answer calls until it is set to another mode. In this respect, the application involves technology essentially identical to the device patented by Curtis, et al., U.S. Patent No. 3,723,656 (Curtis).

**COUNSEL:** Keith D. Beecher, Jessup, Beecher & Slehofer, of Santa Monica, California, argued for Appellant.

Murriel E. Crawford, Assistant Solicitor, Office of the Solicitor, of Arlington, Virginia, argued for Appellee. With her on the brief was Fred E. McKelvey, Solicitor.

**JUDGES:** Archer, Circuit Judge, Baldwin, Senior Circuit Judge, and Tashima, District Judge. \*

\* District Judge A. Wallace Tashima of the Central District of California, sitting by designation.

**OPINION BY: PER CURIAM**

**OPINION**

[\*\*832] This appeal is from the decision of the United States Patent and Trademark Office Board of Patent Appeals and Interferences (Board), Appeal No. 89-1286, dated June 30, 1989, affirming the examiner's final rejection of both claims of Raymond G. Bond's patent application Serial No. 840,007, filed March 17, 1986, entitled "Remote Turn-on Control System for Telephone Answering Machine." We vacate-in-part, reverse-in-part and remand.

Bond claims a combination of the above technology and a delay means which would prevent the machine from answering the owner's initial call for a predetermined period of time after it has set itself to answer (claim 1). Bond argues that the prior art does not leave sufficient time to hang up after setting the machine to answer, and the owner therefore may incur toll charges. Claim 1 was rejected under 35 U.S.C. § 102 over Curtis. Bond also claims the use of a microcomputer containing an internal counter to implement the control and delay structures (claim 2). Claim 2 was rejected under 35 U.S.C. § 103 [\*\*3] over Curtis in view of Hanscom.<sup>1</sup>

1 Hanscom was awarded U.S. Patent No. 4,400,586 for a "Remote Message Repeat Control For Telephone Answering System." Hanscom's claimed invention includes a means for retrieving messages remotely using a "beeper" to alert the machine that it should perform that function. The Hanscom specification provides that the essential control functions are performed by a microcomputer.

910 F.2d 831, \*832; 1990 U.S. App. LEXIS 13087, \*\*3;  
15 U.S.P.Q.2D (BNA) 1566

## II

The Board affirmed the examiner's rejection of claim 1. "For a prior art reference to anticipate in terms of 35 U.S.C. § 102, every element of the claimed invention must be identically shown in a single reference." *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 677, 7 USPQ2d 1315, 1317 (Fed. Cir. 1985). These elements must be arranged as in the claim under review, *Lindemann Maschinenfabrik v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984), [\*\*4] but this is not an "ipissimis verbis" test, *Akzo N.V. v. United States Int'l Trade Comm'n*, 808 F.2d 1471, 1479 & n. 11, 1 USPQ2d 1241, 1245 & n. 11 (Fed. Cir. [\*\*833] 1986), cert. denied, 482 U.S. 909, 96 L. Ed. 2d 382, 107 S. Ct. 2490 (1987). "Anticipation is a fact question subject to review under the clearly erroneous standard." *In re King*, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986).

Claim 1 provides for a combination of control means, first circuit means, second circuit means, and

delay means included in said control means for delaying the seizure of said telephone line by said second circuit means for a predetermined time interval after said telephone answering machine has been set to said automatic answering mode so as to permit the calling party to get off the telephone line and avoid telephone charges.

line before any toll charges are assessed.

Once pin 31 "goes high," the answering machine immediately seizes the line. By contrast, seizure of the line is delayed in the Curtis device through analog means. 2 A delay occurs between the time the machine sets to answer -- in response to, for example, the tenth ring signal -- and the seizure of the line -- which takes place only on receipt of the next ring signal.<sup>3</sup>

2 The board found that "Curtis disclosed a delay means (R1-R5, C3-C4 and the fixed time between rings) which delays the seizure of the telephone line for a predetermined time after the machine has been set." It would seem from our review of the Curtis disclosure that resistors R1 - R5 and capacitors C3 and C4 do not function to produce any delay *after* the device is energized, i.e., set to the automatic answering mode. Rather, their role seems to be limited to producing the delay that precedes the energizing of the answering device. If our understanding of the Curtis disclosure is correct, the delay experienced by the Curtis device between the time the device is energized and the time it seizes the telephone line is a function solely of the fixed time between telephone rings, which delay is not produced by structure within the Curtis device. In view of our vacatur and remand of the board's decision regarding claim 1 on other grounds, we need not further consider the question of whether there is structure in Curtis to delay seizure of the line after the device is energized.

[\*\*6]

3 The board found that in the Curtis device "the line is not seized immediately but only *after* one additional ring" (emphasis added); the Curtis specification discloses that the incoming call is answered by the answering machine "on" the next ring. *See* col. 4, lines 16-17.

The disclosed and prior art structures are not identical, but the claim may nonetheless be anticipated. While a "means-plus-function" limitation may appear to include all means capable of achieving the desired function, the statute requires that it be "construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." 35 U.S.C. § 112 para. 6 (emphasis added); *see In re Iwahashi*, 888 F.2d 1370, 1375 n. 1, 12 USPQ2d 1908, 1912 n. 1 (Fed.

"It is axiomatic that, in proceedings before the PTO, claims in an application are to be given their [\*\*5] broadest reasonable interpretation consistent with the specification, [] and that claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Sneed*, 710 F.2d 1544, 1548, 218 USPQ 385, 388 (Fed. Cir. 1983) (citations omitted). The specification provides that this delay is implemented through digital means as follows:

When the telephone answering machine is so set to the automatic answer mode, an internal counter in the microcomputer Z107 delays the time until pin 31 goes high, so that actual line seizure is delayed. This permits the calling party to get off the

910 F.2d 831, \*833; 1990 U.S. App. LEXIS 13087, \*\*6; 15 U.S.P.Q.2D (BNA) 1566

*Cir. 1989*) (applying § 112 para. 6 to PTO proceedings, and harmonizing prior case law); *Johnston v. Ivax Corp.*, 885 F.2d 1574, 1580, 12 USPQ2d 1382, 1386 (Fed. Cir. 1989) [\*\*7] ("section 112 para. 6 operates to *cut back* on the types of *means* which could literally satisfy the claim language." (emphasis in original)). However, the Board made no finding that the delay means of claim 1 and that embodied in the Curtis device are structurally equivalent. Accordingly, its decision as to the anticipation of claim 1 is deficient and must be vacated. Since structural equivalency under *section 112* para. 6 is a question of fact, *see Pennwalt Corp. v. Durand-Wayland*, 833 F.2d 931, 933-34, 4 USPQ2d 1737, 1739 (Fed. Cir. 1987) (*in banc*), the [\*\*834] court will not reach that question in the first instance.<sup>4</sup>

4 In light of this disposition, the court need not resolve the question of how closely synchronized are the ring signals heard by the calling and called parties.

### III

The Board rejected claim 2, which depends from claim 1, on the ground that the use of a microcomputer to achieve the delay would have been obvious to one skilled in the art. "A [\*\*8] determination that an invention would have been obvious under § 103 is a conclusion of law based on fact. [] The degree to which the determination involves facts, and is thus subject to the 'clearly erroneous' standard . . . is that degree required to erect a foundation of facts sufficient to support the legal conclusion." *Ryco, Inc. v. Ag-Bag Corp.*, 857 F.2d 1418, 1423, 8 USPQ2d 1323, 1327 (Fed. Cir. 1988) (citations omitted). *See also In re Caveney*, 761 F.2d 671, 674, 226 USPQ 1, 3 (Fed. Cir. 1985).

Claim 2 modifies claim 1 by defining the control and delay means thereof as "comprising a microcomputer having an internal counter to delay the seizure of said telephone line until the counter reaches a predetermined count." In its opinion, the Board stated:

Curtis discloses an analog circuit for counting calls [sic, rings]. . . . Hanscom discloses that it was conventional to count calls [rings] digitally in a telephone answering machine by means of a microcomputer. . . . We hold that the artisan, having the suggestions of Curtis and Hanscom before him at the time the

invention was [\*\*9] made, would have found it manifestly obvious to combine these teachings to obtain the subject matter of claim 2.

We are convinced that this holding does not recognize that there are critical differences between the claimed invention and the prior art. *See Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467, 15 L. Ed. 2d 545, 56 S. Ct. 654 (1966) (the difference between the claimed invention and the prior art is one of the four factual inquiries pertinent to any obviousness inquiry under 35 U.S.C. § 103). It also does not reflect the admonition of this court that "obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination." *Carella v. Starlight Archery and Pro Line Co.*, 804 F.2d 135, 140, 231 USPQ 644, 647 (Fed. Cir. 1986); *see also ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). The Board's analysis is a classical example [\*\*10] of a hindsight reconstruction of the claimed invention.

Bond's claimed invention includes a microcomputer which functions to delay seizure of the telephone line once the device has been set to the automatic answering mode. The Board found that the Curtis device experiences some delay after it has been energized and before it seizes the telephone line. Such a delay is only inherent in the Curtis system and Curtis neither places any importance on this delay nor specifically notes that line seizure should be further deferred. Hanscom, the secondary reference, discloses a familiar telephone answering machine that employs a microcomputer which delays seizure of the telephone line until after a preset number of rings, while using a microcomputer to count the number of incoming rings. Hanscom is silent with respect to whether a device like that disclosed by Curtis should embody a delay following activation of the answering mode and before line seizure, or how such a delay should be implemented. For the purpose of its combination with Curtis, the Hanscom patent merely discloses that microcomputers can be used as a means for counting telephone rings entering an automatic answering machine.

[\*\*11] When the claimed invention is contrasted

910 F.2d 831, \*834; 1990 U.S. App. LEXIS 13087, \*\*11;  
15 U.S.P.Q.2D (BNA) 1566

with the Curtis and Hanscom devices, a distinct difference becomes apparent -- the claimed invention embodies a microcomputer placed within the system which delays seizure of the telephone line for a predetermined period of time following activation of the device's answering mode. Unless the Curtis and Hanscom disclosures would [\*835] have suggested to one of ordinary skill in the art at the time the invention was made that a microcomputer should be so employed, claim 2 is not unpatentable under 35 U.S.C. § 103 on this record. *See Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1050-51, 5 USPQ2d 1434, 1435 (Fed. Cir.) cert. denied, 488 U.S. 825, 109 S. Ct. 75, 102 L. Ed. 2d 51 (1988). On balance, we conclude, given the factual findings of the Board (including the finding that the Curtis device *does* contain some structure which is involved in producing the inherent delay in seizing the telephone line after activation of the automatic answering mode, *see* footnote 2, *supra*), that even though the Curtis device does experience some inherent delay, the cited references [\*12] would not have suggested the claimed invention to one of ordinary skill. Neither reference expressly or implicitly suggests that a microcomputer assembly should be embodied in a Curtis-like device in

such a manner as would produce the inherent, yet unmentioned, delay experienced by the Curtis device.

#### IV

In conclusion, the Board's decision is (1) vacated insofar as it holds that the invention of claim 1 of Bond's application is anticipated by the Curtis device; (2) reversed insofar as it holds that claim 2 is unpatentable under 35 U.S.C. § 103 over Curtis in view of Hanscom; and (3) remanded. On remand, the Board should consider whether the delay experienced by the Curtis device after activation of the answering mode and before seizure of the telephone line is caused by any "structure" within the Curtis device and, if so, whether this "structure" is equivalent to that disclosed in Bond's specification as exemplary of the claim 1 delay means. Only if each of these inquiries is answered in the affirmative is the invention defined in claim 1 anticipated by the Curtis disclosure.

VACATED-IN-PART, REVERSED-IN-PART, and REMANDED.

LEXSEE 527 F.2D 1226

IN THE MATTER OF THE APPLICATION OF WILLIAM P. CLINTON, JOE W. JOHNSON, FRANKLYN W. MEYER, RICHARD A. PFLUGER, and GERALD E. JACOBS

Patent Appeal No. 75-587

UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

*527 F.2d 1226; 1976 CCPA LEXIS 201; 188 U.S.P.Q. (BNA) 365*

January 15, 1976, DECIDED.

PRIOR HISTORY: [\*\*1] Serial No. 830,195.

OPINION BY: LANE

OPINION

[\*1226] LANE, Judge.

This is an appeal from the decision of the Patent and Trademark Office Board of Appeals affirming the examiner's rejection of claims 1, 3, and 5 through 9, all of the claims remaining in application serial No. 830,195, filed May 20, 1969, for an "Improved Process for Producing Aromatized Freeze-Dried Coffee." We affirm.

#### Background

The subject matter of the claims is a process of producing a stable, freeze-dried, soluble coffee. Roasted and [\*1227] ground coffee is percolated to obtain a coffee extract containing from 20% to 35% soluble coffee solids. This initial coffee extract is freeze concentrated by partial freezing to form ice crystals and concentrated coffee extract. The concentrated coffee extract, containing 35% to 55% soluble coffee solids, is separated from the ice crystals and frozen, comminuted, and dried.

The concentrated coffee extract is first cooled below its eutectic point, and the frozen extract is ground to a granular particle size.

Freeze drying the granular frozen concentrated coffee extract is generally accomplished at a condenser temperature below -30 degrees F. and a pressure [\*\*2] below 500 microns, until the granular frozen extract has a moisture content of between 1% and 2.5%.

Claims 1 and 8 are representative:

1. A process for preparing a granular freeze-dried coffee having a dark color which comprises percolating roasted and ground coffee to obtain a coffee extract containing 20-35% soluble solids and desired flavor and aroma values, freeze-concentrating said extract to a solids level of 35-55% by partially freezing the water in said extract as ice crystals and removing said ice crystals from the concentrated extract, cooling said concentrated extract to below its eutectic point, grinding the frozen extract to a granular particle size, and then freeze-drying said granular frozen extract to between 1 and 2.5% moisture under vacuum conditions of less than 500 microns while maintaining the product temperature of said coffee below 120 degrees F.

8. The process of claim 1 wherein the coffee extract is chilled to between 33 degrees and 45 degrees F. and held for a period sufficient to cause insoluble sediment to form in the extract and then separating said sediment from the extract prior to freeze-concentration.

The patents relied upon by the board [\*\*3] are:

527 F.2d 1226, \*1227; 1976 CCPA LEXIS 201, \*\*3;  
188 U.S.P.Q. (BNA) 365

Colton	2,751,687 June 26, 1956
Ganiaris	3,283,522 November 8, 1966 (filed Nov. 4, 1963)
Cottle et al.	3,362,178 January 9, 1968 (filed Jan. 3, 1964)
Clinton et al.	3,428,784 April 15, 1969

The board also relied on M. Sivetz, Coffee Processing Technology, 14-25 (1963).

Flosdorff discloses a process of freeze drying fruit juices and extracts such as coffee extract. The solution to be freeze dried is preconcentrated, e.g., by subjecting the material to partial freezing with the formation of a slurry of ice crystals and concentrate, and separating the concentrate from the ice crystals. The preconcentrated product is then frozen and, after freezing, subjected to a high vacuum to remove the water present and dry the product. The dried product may be granulated. If the process is carried out as a continuous process (rather than a batch process), the concentrate may be frozen and granulated prior to freeze drying.

Colton discloses a process of preserving materials such as food extracts and beverages by freezing the material, granulating the frozen material, and freeze drying the frozen granules.

Ganiaris discloses [\*\*4] a process for freeze concentrating an aqueous solution such as coffee. The aqueous solution is chilled to form a slurry of ice crystals and concentrated aqueous solution. The concentrated solution is separated from the ice crystals.

Cottle et al. disclose a process of removing sediment formed on cooling an aqueous solution. Upon cooling, an aqueous solution may form a sediment at a temperature slightly above the temperature at which ice crystals begin to form. This is disclosed to be a problem in processes of concentration by crystallization, e.g., concentrating food products and beverages by crystallization. This sediment may be removed and the solution further cooled to form a slurry of [\*1228] ice crystals and concentrated aqueous solution. The ice crystals are separated from the concentrated aqueous solution.

Clinton et al. disclose a process of freeze drying a coffee extract. The coffee extract is slowly frozen from its ice point to below its eutectic point over a period of at

least 15 minutes to develop a non-ordered distribution of dendritic ice crystals. The dendritic ice crystals are characterized by non parallel main stems, smaller extending branches from [\*\*5] said main stems, and an absence of ice crystals of non-dendritic form in the eutectic mixture located between the dendritic ice crystals. The frozen coffee extract is comminuted to obtain a granular product. This frozen granular product is vacuum freeze-dried.

The portion of the Sivetz treatise on coffee processing technology relied upon discloses that freeze concentration can produce a concentrated extract containing 50% soluble coffee solids. Although Sivetz states that (at the time of his publication) freeze concentration of coffee solids was not practiced commercially, this statement is qualified by the statement that both theoretical and practical considerations favor freeze concentration.

The examiner rejected all of the claims under *35 USC 103*, either in view of the disclosure of Flosdorff considered together with Colton and Sivetz, or in view of the disclosure of Clinton et al. considered together with Ganiaris. The examiner also relied upon the disclosure of Cottle et al. in connection with the cooling and clarification steps of claims 8 and 9. The board affirmed each rejection.

#### OPINION

Appellants admit that the individual steps of freeze concentrating and freeze [\*\*6] drying a coffee extract are disclosed in the prior art, but contend that there is no suggestion in the prior art to combine these individual steps. With respect to the additional steps of cooling and clarification in claims 8 and 9, appellants admit that these steps are also generally disclosed in the prior art, but contend that it would not have been obvious to apply these procedures to remove sediment from coffee extract prior to freeze concentration. Appellants also contend that when all the prior art is considered together, one of ordinary skill in the art would not have a sufficient basis

527 F.2d 1226, \*1228; 1976 CCPA LEXIS 201, \*\*6,  
188 U.S.P.Q. (BNA) 365

for the necessary predictability of success to sustain a rejection under 35 USC 103. *In re Mercier*, 515 F.2d 1161, 1167, 185 USPQ 774, 779 (CCPA 1975).

We have carefully reviewed the record and are persuaded that a person of ordinary skill in the art would have had sufficient motivation to combine the individual steps forming the claimed process. *In re Adams*, 53 CCPA 996, 1000, 356 F.2d 998, 1001-02, 148 USPQ 742, 745 (1966); *In re Bergel*, 48 CCPA 1102, 1105, 292 F.2d 955, 956-57, 130 USPQ 206, 208 (1961).

We first consider the references by themselves to see whether they suggest doing [\*7] what appellants have done. *In re Skoll*, 523 F.2d 1392, 187 USPQ 481 (CCPA 1975). Flosdorf alone suggests subjecting a coffee extract to a combination of freeze concentration and freeze drying. Cottle et al. disclose that freeze concentration of food products and beverages generally may result in the formation of a sediment which can be removed by cooling and clarification. Although Cottle et al. do not disclose sediment formation in coffee extract in particular, we think it would have been within the ability of a worker of ordinary skill in the art aware of Cottle et al. to subject a coffee extract to gradual cooling and to remove any resultant sediment prior to freeze concentration.

We next consider whether a person of ordinary skill in the art combining the individual steps which form the claimed process would have a sufficient basis for the required expectation of success. Obviousness does not require absolute predictability, but a reasonable expectation of success is necessary. *In re Mercier, supra*; *In re Naylor*, 54 CCPA 902, 369 F.2d 765, 152 USPQ 106 (1966); *In re Panzer*, 52 CCPA 1135, 341 F.2d 121, 144 USPQ 415 (1965). Flosdorf states that the freeze-dried coffee [\*1229] [\*8] obtained by the disclosed process has excellent properties. Appellant argues that Sivetz discloses that some flavor is lost in freeze concentrating a coffee extract. Nothing in the Sivetz reference detracts from the clear statements in Flosdorf. Cottle et al. are concerned with preserving the original freshness and flavor of food products and beverages. We think a person of ordinary skill in the art would reasonably expect that the combination of steps suggested by the references would produce a freeze-dried coffee having desirable properties. We conclude that these references made a prima facie case of obviousness which appellants have failed to rebut.

Appellants also contend that the Board of Appeals has ignored certain claim limitations requiring freeze drying the coffee extract to a final moisture content between 1% and 2.5%. Appellants point to certain statements in the disclosure of their application which they allege establish that the claimed moisture content is critical. Appellants' specification states:

It is necessary to dry the coffee extract to a stable moisture level of between 1 and 2.5%. Above this moisture range, it has been found that the soluble coffee [\*9] product cakes and develops off-flavors upon storage. However, care should be taken not to dry the extract to a level of below 1% moisture since over-drying will cause an excess removal of aromatic materials including those which are essential to a good coffee flavor.

Absent any evidence to the contrary, we accept these statements as proof that the claimed final moisture content is critical. *Pines v. McAllister*, 38 CCPA 981, 988, 188 F.2d 388, 392, 89 USPQ 312, 315 (1951). Nevertheless we believe that a person of ordinary skill in the art would find the claimed final moisture content obvious in view of the cited references. The only detailed disclosure in Flosdorf describes freeze concentrating and freeze drying orange juice to a final moisture content of about 0.3%. In our opinion, one skilled in this art would start with 0.3% as a possible final moisture content for freeze-dried coffee. Recognizing the flavor deficiencies, the skilled artisan would tend to depart from 0.3%. The references all state that freeze drying is an expensive method of removing water. Economics alone would motivate a person of ordinary skill in the art producing a freeze-dried coffee by the Flosdorf [\*10] process to find the highest final moisture content consistent with the excellent properties Flosdorf describes. A person of ordinary skill in the art, having no reason to expect that the optimum final moisture content of freeze-dried coffee is the same as freeze-dried orange juice, and being motivated to permit a higher final moisture content if possible, would soon find the claimed final moisture content.

#### Conclusion

The decision of the board is affirmed.

AFFIRMED

LEXSEE 175 F.3D 994

IN RE ANITA DEMBICZAK and BENSON ZINBARG, *Appellants.*

98-1498

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

*175 F.3d 994; 1999 U.S. App. LEXIS 8109; 50 U.S.P.Q.2D (BNA) 1614*

April 28, 1999, Decided

**PRIOR HISTORY:** [\*\*1]Appealed from: Patent and Trademark Office Board of Patent Appeals and Interferences. (Serial No. 08/427,732).

**DISPOSITION:** REVERSED.

**COUNSEL:** David P. Gordon, of Stamford, Connecticut, argued for appellant. Of counsel was Thomas A. Gallagher, of Stamford, Connecticut.

John M. Whealan, Associate Solicitor, Office of the Solicitor, of Arlington, Virginia, argued for appellee. With him on the brief were Albin F. Drost, Acting Solicitor, and David R. Nicholson, Associate Solicitor.

**JUDGES:** Before MAYER, Chief Judge, MICHEL and CLEVENGER, Circuit Judges.

**OPINION BY:** CLEVENGER

**OPINION**

[\*996] CLEVENGER, *Circuit Judge.*

Anita Dembiczkak and Benson Zinbarg appeal the rejection, upheld by the Board of Patent Appeals and Interferences, of all pending claims in their Application No. 08/427,732. *See Ex Parte Dembiczkak*, No. 96-2648, slip op. at 43 (May 14, 1998). Because the Board erred in sustaining rejections of the pending claims as obvious under 35 U.S.C. § 103(a) (Supp. 1998), and for obviousness-type double patenting, we reverse.

I

The invention at issue in this case is, generally

speaking, a large trash bag made of orange plastic and decorated with lines and facial features, allowing the bag, when filled [\*\*2] with trash or leaves, to resemble a Halloween-style pumpkin, or jack-o'-lantern. As the inventors, Anita Dembiczkak and Benson Zinbarg (collectively, "Dembiczkak") note, the invention solves the long-standing problem of unsightly trash bags placed on the curbs of America, and, by fortuitous happenstance, allows users to express their whimsical or festive nature while properly storing garbage, leaves, or other household debris awaiting collection. Embodiments of the invention--sold under a variety of names, including Giant Stuff-A-Pumpkin TM, Funkins, Jack Sak TM, and Bag-O-Fun TM--have undisputedly been well-received by consumers, who bought more than seven million units in 1990 alone. Indeed, in 1990, the popularity of the pumpkin bags engendered a rash of thefts around Houston, Texas, leading some owners to resort to preventative measures, such as greasing the bags with petroleum jelly and tying them to trees. *See* R. Piller, "Halloween Hopes Die on the Vine," *Hous. Chron.*, Oct. 19, 1990, at 13A.

The road to profits has proved much easier than the path to patentability, however. In July 1989, Dembiczkak filed a utility patent application generally directed to the pumpkin bags. [\*\*3] In a February 1992 appeal, the Board of Patent Appeals and Interferences ("the Board") reversed the Examiner's rejection, but entered new grounds for rejection. Dembiczkak elected to continue prosecution, filing a continuation application to address the new grounds for rejection. Thereafter, the invention made a second appearance before the Board, in April 1993, when the Board both sustained the Examiner's rejection and again entered new grounds for rejection. Again, a continuation application was filed (the instant

application). And again the Examiner's rejection was appealed to the Board, which sustained the rejection in a May 14, 1998, decision. *See Dembiczak*, slip op. at 43.

A

The patent application at issue includes claims directed to various embodiments of [\*997] the pumpkin bag. Claims 37, 49, 51, 52, 58 through 64, 66 through 69, and 72 through 81 are at issue in this appeal. Though the claims vary, independent claim 74 is perhaps most representative:

74. A decorative bag for use by a user with trash filling material, the bag simulating the general outer appearance of an outer surface of a pumpkin having facial indicia thereon, comprising:

a flexible waterproof plastic [\*\*4] trash or leaf bag having

an outer surface which is premanufactured orange in color for the user to simulate the general appearance of the outer skin of a pumpkin, and having

facial indicia including at least two of an eye, a nose and a mouth on the orange color outer surface for forming a face pattern on said orange color outer surface to simulate the general outer appearance of a decorative pumpkin with a face thereon,

said trash or leaf bag having first and second opposite ends, at least said second end having an opening extending substantially across the full width of said trash or leaf bag for receiving the trash filling material,

wherein when said trash or leaf bag is filled with trash filling material and closed, said trash or leaf bag takes the form and general appearance of a pumpkin with a face thereon.

All of the independent claims on appeal, namely 37, 52, 72, and 74, contain limitations that the bag must be "premanufactured orange in color," have "facial indicia,"

have openings suitable for filling with trash material, and that when filled, the bag must have a generally rounded appearance, like a pumpkin. Independent claims 37, 52, and 72 add the [\*\*5] limitation that the bag's height must at least 36 inches. Claim 72 requires that the bag be made of a "weatherproof material," and claim 74, as shown above, requires that the bag be "waterproof." Claim 52 recites a "method of assembling" a bag with the general characteristics of apparatus claim 37.

B

The prior art cited by the Board includes:

(1) pages 24-25 of a book entitled "A Handbook for Teachers of Elementary Art," by Holiday Art Activities ("Holiday"), describing how to teach children to make a "Crepe Paper Jack-O-Lantern" out of a strip of orange crepe paper, construction paper cut-outs in the shape of facial features, and "wadded newspapers" as filling;

(2) page 73 of a book entitled "The Everything Book for Teachers of Young Children," by Martha Shapiro and Valerie Indenbaum ("Shapiro"), describing a method of making a "paper bag pumpkin" by stuffing a bag with newspapers, painting it orange, and then painting on facial features with black paint;

(3) U.S. Patent No. 3,349,991 to Leonard Kessler, entitled "Flexible Container" ("Kessler"), describing a bag apparatus wherein the bag closure is accomplished by the use of folds or gussets in the bag material;

(4) [\*\*6] U.S. Patent No. Des. 310,023, issued August 21, 1990 to Dembiczak ("Dembiczak '023"), a design patent depicting a bag with a jack-o'-lantern face;

(5) U.S. Patent No. Des. 317,254, issued June 4, 1991 to Dembiczak ("Dembiczak '254"), a design patent depicting a bag with a jack-o'-lantern face; and,

175 F.3d 994, \*997; 1999 U.S. App. LEXIS 8109, \*\*6;  
50 U.S.P.Q.2D (BNA) 1614

(6) Prior art "conventional" plastic lawn or trash bags ("the conventional trash bags").

Using this art, the Board affirmed the Examiner's final rejection of all the independent claims (37, 52, 72, 74) under 35 U.S.C. § 103, [\*998] holding that they would have been obvious in light of the conventional trash bags in view of the Holiday and Shapiro references. The Board determined that, in its view of the prior art, "the only difference between the invention presently defined in the independent claims on appeal and the orange plastic trash bags of the prior art and the use of such bags resides in the application of the facial indicia to the outer surface of the bag." *Dembiczak*, slip op. at 18. The Board further held that the missing facial indicia elements were provided by the Holiday and Shapiro references' description of painting jack-o'-lantern faces on paper bags. *See* [\*7] *id.* at 18-19. Dependent claims 49 and 79, which include a "gussets" limitation, were considered obvious under similar reasoning, except that the references cited against them included Kessler. *See id.* at 7.

The Board also affirmed the Examiner's obviousness-type double patenting rejection of all the independent claims in light of the two Dembicza design patents ('023 and '254) and Holiday. *See id.* at 12. The Board held that the design patents depict a generally rounded bag with jack-o'-lantern facial indicia, and that the Holiday reference supplies the missing limitations, such as the "thin, flexible material" of manufacture, the orange color, the initially-open upper end, and the trash filling material. The Board also stated that the various limitations of the dependent claims—e.g., color, the inclusion of leaves as stuffing, and the dimensions—would all be obvious variations of the depictions in the Dembicza design patents. *See id.* at 8-9. In addition, using a two-way test for obviousness-type double patenting, the Board held that the claims of the Dembicza design patents "do not exclude" the additional structural limitations of the pending utility claims, [\*8] and thus the design patents were merely obvious variations of the subject matter disclosed in the utility claims. *See id.* at 11. The Board further upheld, on similar grounds and with the inclusion of the Kessler reference, the obviousness-type double patenting rejection of dependent claim 49. *See id.* at 12.

This appeal followed, vesting this court with

jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A) (1994).

## II

A claimed invention is unpatentable if the differences between it and the prior art "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103(a) (Supp. 1998); *see Graham v. John Deere Co.*, 383 U.S. 1, 14, 148 U.S.P.Q. (BNA) 459, 465, 15 L. Ed. 2d 545, 56 S. Ct. 684 (1966). The ultimate determination of whether an invention is or is not obvious is a legal conclusion based on underlying factual inquiries including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. *See Graham*, 383 U.S. at 17-18, 148 U.S.P.Q. (BNA) [\*9] at 467; *Miles Labs, Inc. v. Shandon, Inc.*, 997 F.2d 870, 877, 27 U.S.P.Q.2D (BNA) 1123, 1128 (Fed. Cir. 1993). We therefore review the ultimate determination of obviousness without deference to the Board, while examining any factual findings for clear error. *See, e.g., In re Zurko*, 142 F.3d 1447, 1459, 46 U.S.P.Q.2D (BNA) 1691, 1700 (Fed. Cir.) (en banc), *cert. granted*, 119 S. Ct. 401 (1998).

## A

Our analysis begins in the text of *section 103* quoted above, with the phrase "at the time the invention was made." For it is this phrase that guards against entry into the "tempting but forbidden zone of hindsight," *see Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 873, 228 U.S.P.Q. (BNA) 90, 98 (Fed. Cir. 1985), *overruled on other grounds by Nobelpharma AB v. Implant Innovations, Inc.*, 141 F.3d 1059, 46 U.S.P.Q.2D (BNA) 1097 [\*999] (Fed. Cir. 1998), when analyzing the patentability of claims pursuant to that section. Measuring a claimed invention against the standard established by *section 103* requires the oft-difficult but critical step of casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted [\*10] wisdom in the field. *See, e.g., W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 U.S.P.Q. (BNA) 303, 313 (Fed. Cir. 1983). Close adherence to this methodology is especially important in the case of less technologically complex inventions, where the very ease with which the invention can be understood may prompt one "to fall victim to the

insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *Id.*

Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is a rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. *See, e.g., C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1352, 48 U.S.P.Q.2D (BNA) 1225, 1232 (Fed. Cir. 1998) (describing "teaching or suggestion or motivation [to combine]" as an "essential evidentiary component of an obviousness holding"); *In re Rouffet*, 149 F.3d 1350, 1359, 47 U.S.P.Q.2D (BNA) 1453, 1459 (Fed. Cir. 1998) ("the Board must identify specifically . . . the reasons one of ordinary skill in the art would have been motivated to select [\*11] the references and combine them"); *In re Fritch*, 972 F.2d 1260, 1265, 23 U.S.P.Q.2D (BNA) 1780, 1783 (Fed. Cir. 1992) (examiner can satisfy burden of obviousness in light of combination "only by showing some objective teaching [leading to the combination]"); *In re Fine*, 837 F.2d 1071, 1075, 5 U.S.P.Q.2D (BNA) 1596, 1600 (Fed. Cir. 1988) (evidence of teaching or suggestion "essential" to avoid hindsight); *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 297, 227 U.S.P.Q. (BNA) 657, 667 (Fed. Cir. 1985) (district court's conclusion of obviousness was error when it "did not elucidate any factual teachings, suggestions or incentives from this prior art that showed the propriety of combination"). *See also Graham*, 383 U.S. at 18, 148 U.S.P.Q. (BNA) at 467 ("strict observance" of factual predicates to obviousness conclusion required). Combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability--the essence of hindsight. *See, e.g., Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 U.S.P.Q. (BNA) 543, 547 (Fed. Cir. 1985) ("The invention [\*12] must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time."). In this case, the Board fell into the hindsight trap.

We have noted that evidence of a suggestion, teaching, or motivation to combine may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved, *see Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37

U.S.P.Q.2D (BNA) 1626, 1630 (Fed. Cir. 1996). *Para-Ordnance Mfg. v. SGS Imports Intern., Inc.*, 73 F.3d 1055, 1058, 37 U.S.P.Q.2D (BNA) 1237, 1240 (Fed. Cir. 1995), although "the suggestion more often comes from the teachings of the pertinent references," *Rouffet*, 149 F.3d at 1353, 47 U.S.P.Q.2D (BNA) at 1456. The range of sources available, however, does not diminish the requirement for actual evidence. That is, the showing must be clear and particular. *See, e.g., C.R. Bard*, 157 F.3d 1340 at 1352, 48 U.S.P.Q.2D (BNA) at 1232. Broad conclusory statements regarding the teaching of multiple references, standing alone, are not "evidence." *E.g., McElmurry v. Arkansas Power & Light Co.*, 995 F.2d 1576, 1578, 27 U.S.P.Q.2D (BNA) [\*13] 1129, 1131 (Fed. Cir. 1993) ("Mere denials and conclusory statements, however, are not sufficient to establish a genuine issue of [\*1000] material fact."); *In re Schert*, 566 F.2d 1154, 1164, 196 U.S.P.Q. (BNA) 209, 217 (CCPA 1977) ("The examiner's conclusory statement that the specification does not teach the best mode of using the invention is unaccompanied by evidence or reasoning and is entirely inadequate to support the rejection."). In addition to demonstrating the propriety of an obviousness analysis, particular factual findings regarding the suggestion, teaching, or motivation to combine serve a number of important purposes, including: (1) clear explication of the position adopted by the Examiner and the Board; (2) identification of the factual disputes, if any, between the applicant and the Board; and (3) facilitation of review on appeal. Here, however, the Board did not make particular findings regarding the locus of the suggestion, teaching, or motivation to combine the prior art references.

All the obviousness rejections affirmed by the Board resulted from a combination of prior art references, *e.g.*, the conventional trash or yard bags, and the Holiday and Shapiro publications teaching [\*14] the construction of decorated paper bags. *See Dembicak*, slip op. at 6-7. To justify this combination, the Board simply stated that "the Holiday and Shapiro references would have suggested the application of . . . facial indicia to the prior art plastic trash bags." *Id. at 18-19*. However, rather than pointing to specific information in Holiday or Shapiro that suggest the combination with the conventional bags, the Board instead described in detail the similarities between the Holiday and Shapiro references and the claimed invention, noting that one reference or the other-in combination with each other and the conventional trash bags--described all of the limitations of the pending

175 F.3d 994, \*1000; 1999 U.S. App. LEXIS 8109, \*\*14;  
50 U.S.P.Q.2D (BNA) 1614

claims. *See id.* at 18-28. Nowhere does the Board particularly identify any suggestion, teaching, or motivation to combine the children's art references (Holiday and Shapiro) with the conventional trash or lawn bag references, nor does the Board make specific—or even inferential—findings concerning the identification of the relevant art, the level of ordinary skill in the art, the nature of the problem to be solved, or any other factual findings that might serve to support a proper obviousness [\*\*15] analysis. *See, e.g., Pro-Mold & Tool*, 75 F.3d at 1573, 37 U.S.P.Q.2D (BNA) at 1630.

To the contrary, the obviousness analysis in the Board's decision is limited to a discussion of the ways that the multiple prior art references can be combined to read on the claimed invention. For example, the Board finds that the Holiday bag reference depicts a "premanufactured orange" bag material, *see Dembicza*, slip op. at 21, finds that Shapiro teaches the use of paper bags in various sizes, including "large", *see id.* at 22-23, and concludes that the substitution of orange plastic for the crepe paper of Holiday and the paper bags of Shapiro would be an obvious design choice, *see id.* at 24. Yet this reference-by-reference, limitation-by-limitation analysis fails to demonstrate how the Holiday and Shapiro references teach or suggest their combination with the conventional trash or lawn bags to yield the claimed invention. *See Rouffet*, 149 F.3d at 1357, 47 U.S.P.Q.2D (BNA) at 1459 (noting Board's failure to explain, when analyzing the prior art, "what specific understanding or technical principle . . . would have suggested the combination"). Because we do not discern any finding by [\*\*16] the Board that there was a suggestion, teaching, or motivation to combine the prior art references cited against the pending claims, the Board's conclusion of obviousness, as a matter of law, cannot stand. *See C.R. Bard*, 157 F.3d at 1352, 48 U.S.P.Q.2D (BNA) at 1232; *Rouffet*, 149 F.3d at 1359, 47 U.S.P.Q.2D (BNA) at 1459; *Fritch*, 972 F.2d at 1265, 23 U.S.P.Q.2D (BNA) at 1783; *Fine*, 837 F.2d at 1075, 5 U.S.P.Q.2D (BNA) at 1600; *Ashland Oil*, 776 F.2d at 297, 227 U.S.P.Q. (BNA) at 667.

## B

The Commissioner of Patents and Trademarks ("Commissioner") attempts to justify the Board's decision on grounds [\*\*1001] different from that relied upon by the Board, arguing that one of ordinary skill in the art would have been motivated to combine the references. Of

course, in order to do so, the Commissioner must do what the Board did not do below: make specific findings of fact regarding the level of skill in the art ("a designer and manufacturer of trash and leaf bags, particularly one specializing in the ornamental and graphic design of such bags"), *Resp't Br.* at 14, the relationship between the fields of conventional trash bags and children's crafts, respectively ("the artisan would also have been well aware of the ancillary, [\*\*17] corollary, and atypical uses of 'trash' bags such as their application in hobby and art projects"), *Resp't Br.* at 15, and the particular features of the prior art references that would motivate one of ordinary skill in a particular art to select elements disclosed in references from a wholly different field ("a designer and manufacturer of trash and leaf bags would have recognized the paper bag in Shapiro to be a trash bag and therefore would have been motivated to combine it with the admitted prior art plastic trash and leaf bags to arrive at the claimed invention"), *Resp't Br.* at 15. The Commissioner also appears to cite additional references in support of his obviousness analysis, noting that at least two design patents (in the record but not cited against the presently pending claims) teach the placement of "graphical information, including text, designs, and even facial indicia, to colored bags." *Resp't Br.* at 16. This new analysis, apparently cut from whole cloth in view of appeal, does little more than highlight the shortcomings of the decision below, and we decline to consider it. *See, e.g., In re Robertson*, 1999 U.S. App. LEXIS 3224, 169 F.3d 743, 746, [\*\*18] 49 U.S.P.Q.2D (BNA) 1949, 1951 (Fed. Cir. 1999) ("We decline to consider [the Commissioner's] newly-minted theory as an alternative ground for upholding the agency's decision."); *In re Soni*, 54 F.3d 746, 751, 34 U.S.P.Q.2D (BNA) 1684, 1688 (Fed. Cir. 1995); *In re Hounsfeld*, 699 F.2d 1320, 1324, 216 U.S.P.Q. (BNA) 1045, 1049 (Fed. Cir. 1983) (rejecting an "attempt[] by the Commissioner 'to apply a new rationale to support the rejection.'"); *see also* 35 U.S.C. § 144 (1994) (an appeal to the Federal Circuit "is taken on the record before The Patent and Trademark Office"). Because the Board has not established a *prima facie* case of obviousness, *see In re Bell*, 991 F.2d 781, 783, 26 U.S.P.Q.2D (BNA) 1529, 1531 (Fed. Cir. 1993) ("The PTO bears the burden of establishing a case of *prima facie* obviousness."), we therefore reverse the obviousness rejections, and have no need to address the parties' arguments with respect to secondary factors.

## III

175 F.3d 994, \*1001; 1999 U.S. App. LEXIS 8109, \*\*18,  
50 U.S.P.Q.2D (BNA) 1614

Dembiczak also asks this court to reverse the Board's rejection of the pending claims for obviousness-type double patenting, which is a judicially-created doctrine that seeks to prevent the applicant from expanding the grant of the patent right beyond the [\*19] limits prescribed in Title 35. *See, e.g., In re Braat*, 937 F.2d 589, 592, 19 U.S.P.Q.2D (BNA) 1289, 1291-92 (*Fed. Cir. 1999*); *In re Longi*, 759 F.2d 887, 892, 225 U.S.P.Q. (BNA) 645, 648 (*Fed. Cir. 1983*). *See also* 35 U.S.C. § 154(a)(2) (Supp. 1998) (discussing patent term). The doctrine prohibits claims in a second patent which define "merely an obvious variation" of an invention claimed by the same inventor in an earlier patent. *Braat*, 937 F.2d at 592, 19 U.S.P.Q.2D (BNA) at 1292 (quoting *In re Vogel*, 57 C.C.P.A. 920, 422 F.2d 438, 441, 164 U.S.P.Q. (BNA) 619, 622 (CCPA 1970)). Thus, unless a claim sought in the later patent is patentably distinct from the claims in an earlier patent, the claim must be rejected. *See In re Goodman*, 11 F.3d 1046, 1052, 29 U.S.P.Q.2D (BNA) 2010, 2015 (*Fed. Cir. 1993*); *Vogel*, 422 F.2d at 441, 164 U.S.P.Q. (BNA) at 622. This question is one of law, which we review *de novo*. *See Goodman*, 11 F.3d at 1052, 29 U.S.P.Q.2D (BNA) at 2015; *Texas Instruments Inc. v. United States Int'l Trade Comm'n*, 988 F.2d 1165, 1179, 26 U.S.P.Q.2D (BNA) 1018, 1029 (*Fed. Cir. 1993*).

[\*1002] A

The law provides that, in some very rare cases, obvious-type double patenting may be found between design and utility patents. [\*20] *See Carman Indus., Inc. v. Wahl*, 724 F.2d 932, 939-40, 220 U.S.P.Q. (BNA) 481, 487 (*Fed. Cir. 1983*) (noting that, while theoretically possible, "double patenting is rare in the context of utility versus design patents"); *In re Thorington*, 57 C.C.P.A. 759, 418 F.2d 528, 536-37, 163 U.S.P.Q. (BNA) 644, 650 (CCPA 1969) (Double patenting between a design and utility patent is possible "if the features producing the novel aesthetic effect of a design patent or application are the same as those recited in the claims of a utility patent or application as producing a novel structure."); *In re Phelan*, 40 C.C.P.A. 1023, 205 F.2d 183, 98 U.S.P.Q. (BNA) 156 (CCPA 1953); *In re Barber*, 23 C.C.P.A. 834, 81 F.2d 231, 28 U.S.P.Q. (BNA) 187 (CCPA 1936); *In re Hargraves*, 19 C.C.P.A. 784, 53 F.2d 900, 11 U.S.P.Q. (BNA) 240 (CCPA 1931). In these cases, a "two-way" test is applicable. *See Carman*, 724 F.2d at 940, 220 U.S.P.Q. (BNA) at 487. Under this test, the obviousness-type double patenting rejection is appropriate only if the claims of the two patents cross-read, meaning that "the

test is whether the subject matter of the claims of the patent sought to be invalidated would have been obvious from the subject matter of the claims of the [\*21] other patent, and vice versa." *Id.*, 220 U.S.P.Q. (BNA) at 487. *See also Braat*, 937 F.2d at 593, 19 U.S.P.Q.2D (BNA) at 1292 (explaining two-way test).

B

In making its double patenting rejection, the Board concluded that all but one of the pending claims of Dembiczak's utility application would have been merely an obvious variation of the claims of the earlier-issued design patents--the Dembiczak '023 and '254 references--in light of the Holiday reference. The remaining claim, dependent claim 49, was judged obvious in light of the combination of the Dembiczak design patents, Holiday, and the Kessler reference.

Acknowledging that the two-way test was required by *Carman*, 724 F.2d at 940, 220 U.S.P.Q. (BNA) at 487, the Board concluded that "the design claimed in each of appellants' design patents does not exclude the features pertaining to the construction and color of the bag, the use of a plastic material for making the bag, the size or thickness of the bag . . . or the use of various types of filling material . . . . The particular details of the facial indicia would have been a matter of design choice as evidenced by the Holiday handbook," and that therefore, in view of Holiday, the claims of the [\*22] design patents were obvious variants of the pending utility patent claims. *See Dembiczak*, slip op. at 11. We disagree. In order for a design to be unpatentable because of obviousness, there must first be a basic design reference in the prior art, the design characteristics of which are "basically the same as the claimed design." *In re Borden*, 90 F.3d 1570, 1574, 39 U.S.P.Q.2D (BNA) 1524, 1526 (*Fed. Cir. 1996*); *In re Rosen*, 673 F.2d 388, 391, 213 U.S.P.Q. (BNA) 347, 350 (CCPA 1982). The phrase "having facial indicia thereon" found in the claims of the pending utility application is not a design reference that is "basically the same as the claimed design." *Borden*, 90 F.3d at 1574, 39 U.S.P.Q.2D (BNA) at 1526. In fact, it describes precious little with respect to design characteristics. The Board's suggestion that the design details were simply "a matter of design choice" evinces a misapprehension of the subject matter of design patents. E.g., *Carman*, 724 F.2d at 939 n.13, 220 U.S.P.Q. (BNA) at 486 n.13 ("Utility patents afford protection for the mechanical structure and function of an invention

175 F.3d 994, \*1002; 1999 U.S. App. LEXIS 8109, \*\*22;  
50 U.S.P.Q.2D (BNA) 1614

whereas design patent protection concerns the ornamental or aesthetic features of a design.") Indeed, we note [\*\*23] that the two design patents at issue here--the Dembiczaak '023 and '254 patents--were considered nonobvious over each other, and were even the subject of a restriction requirement. *See 35 U.S.C. § 121 (1994)* ("If two or more independent and distinct inventions are claimed in one [\*1003] application, the Commissioner may require the application to be restricted to one of the inventions."); 37 C.F.R. § 1.142. The position adopted by the Board--that a textual description of facial indicia found in the claims of the utility patent application makes obvious the specific designs claimed in the (patentably distinct) Dembiczaak design patents--would presumably render obvious, or even anticipate, all design patents where a face was depicted on a bag. But this, of course, is not the law; the textual description cannot be said to be a reference "basically the same as the claimed design," of the design patents at issue here. *Borden*, 90 F.3d at 1574, 39 U.S.P.Q.2D (BNA) at 1526 (internal quotation marks omitted). The Board's conclusion of obviousness is incorrect.

Because we find that the Board erred in concluding that the design patents were obvious variants of the pending utility claims, we need not address [\*\*24] the other prong of the two-way double patenting test--whether the pending utility claims are obvious variations of the subject matter claimed in the design patents. *See Carman*, 724 F.2d at 939, 220 U.S.P.Q. (BNA) at 487 (both prongs of the two-way test required for obviousness-type double patenting). The double patenting rejections are reversed.

#### IV

Because there is no evidence in the record of a suggestion, teaching, or motivation to combine the prior art references asserted against the pending claims, the obviousness rejections are reversed. In addition, because the Board misapprehended the test for obviousness-type double patenting, and because the pending utility claims do not render obvious the design patents, the double patenting rejections are also reversed.

*REVERSED*

LEXSEE 535 F.2D 67

IN THE MATTER OF THE APPLICATION OF MAMORU HIRAO and  
YOSHINORI SATO

Patent Appeal No. 76-560

UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

*535 F.2d 67; 1976 CCPA LEXIS 162; 190 U.S.P.Q. (BNA) 15*

May 27, 1976, DECIDED.

PRIOR HISTORY: [\*\*1] Serial No. 839,689.

OPINION BY: MILLER

OPINION

[\*67] MILLER, Judge.

This appeal is from the decision of the Patent and Trademark Office Board of Appeals affirming the rejection of claims 1-4, 10, 17-19, 21, 22, and 24-26 in application serial No. 839,689, filed July 7, 1969, for "Process for Preparing Food and Drinks." We reverse.

The Invention

The invention involves a process of sweetening foods and drinks. The process comprises three steps, the first two being a method of forming a high purity maltose product (which is the sweetening agent) and the third being the use of this product to sweeten the food or drink. Claim 1, the sole independent claim, is illustrative (paragraphing and numbering added):

1. A process for preparing foods and drinks sweetened mildly, and protected against discoloration, Strecker's reaction, and moisture absorption, which comprises:

[1] adding [\*] and [\*] under such conditions and in a quantity sufficient to produce straight chain amylose, to enzymatically liquefied starch which consists essentially of [\*68] amylopectin thereby producing straight-chain amylose;

[2] subjecting the resulting amylose to the action of

[\*] and purifying [\*2] and drying to obtain high purity maltose in crystalline powder form of 90 - 95% maltose; and then

[3] adding said high purity crystalline maltose powder to foods and drinks as the essential added sweetener.

The Board's Opinion

The board, in a new ground of rejection under 37 CFR 1.196(b), found that all of the claims now before the court would have been obvious under 35 USC 103 in view of Jacobs (Jacobs, Chemistry and Technology of Food and Food Products 67-70 (1951)) together with Kjolberg (Kjolberg et al., Studies on Carbohydrate Metabolizing Enzymes, 86 J. BIOCHEMISTRY 258-62 (1963)). (The references are discussed *infra* under "Agreed Statement.") The board stated:

We wish to make it clear that while appellants' method of making high purity maltose appears to be unobvious based on the art of record before us, the method of sweetening food products with high purity maltose would be obvious from the teaching of Jacobs in view of Kjolberg.

In response to a request for reconsideration, the board further stated:

We note that appellants concede that the method of sweetening food products with high purity maltose would be obvious from the teachings of Jacobs in view of [\*3] Kjolberg et al. As to claim 1, it is our considered opinion that, regardless of the process employed in preparing high purity maltose, it is obvious to use such high purity

maltose in sweetening food products.

Agreed Statement

This appeal comes before the court on an agreed statement of the case<sup>1</sup> under court Rule 5.5.<sup>2</sup> The following facts, among others, have been stipulated:

1 See *In re Hirao*, 525 F.2d 1066, 188 USPQ 248 (CCPA 1975).

2 Rule 5.5:

When the questions presented by an appeal to this court can be determined without an examination of all the pleadings, evidence, and proceedings below, the parties may submit an agreed statement of the case in lieu of the record as required by Rule 3.3(b) showing: (1) how the questions arose and were decided in the tribunal from which the appeal is taken; (2) the facts averred and proved or sought to be proved which are essential to a decision of the questions by this court; and (3) a concise statement of the issues to be decided and the points to be relied on by appellant. The statement shall be accompanied by a certified copy of the judgment or ruling appealed from and a certified copy of all opinions, if any, in support thereof.

[\*\*4] 9. Claim 1 is an independent claim on which each of the remaining appealed claims depends, directly or indirectly.

10. The rejection of dependent claims 2 to 4, 10, 17 to 19, 21, 22 and 24 to 26 will stand or fall with the rejection of claim 1.

11. The sole issue to be decided by the present appeal is whether claim 1, and all those claims dependent therefrom, are obvious in the sense of 35 USC 103 over Jacobs in view of Kjolberg.

....

13. The Kjolberg reference teaches one process of making high purity maltose.

14. The Jacobs reference generally teaches that certain undefined maltose products may be used for sweetening food products.

15. Appellants' steps of making high purity maltose,

which appear as the first two steps in claim 1 ..., are novel and unobvious based on the art of record.

16. Appellants' step of adding high purity maltose to foods and drinks as the essential added sweetener, which appears as the third step in claim 1, ... would be obvious from the teachings of Jacobs in view of Kjolberg.

OPINION

As stipulated, the first two steps (forming high purity maltose) would have been unobvious from the art of record, while the [\*69] third [\*\*\*5] step (using high purity maltose as a sweetener) would have been obvious in view of Jacobs together with Kjolberg. Moreover, the Solicitor has stated - without contravention by appellants - that the high purity maltose product formed by the first two steps and the high purity maltose product of the prior art "may be considered the same as far as the process and use recited in the preamble and step [3] of claim 1 are concerned." Thus, the single issue is whether appellants' three-step process is obvious, the first two steps being unobvious but forming a known product, and the third step being the use of this known product in an obvious way. We conclude that due to the admitted unobviousness of the first two steps of the claimed combination of steps, the subject matter as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made. Cf. *In re Mancy*, 499 F.2d 1289, 182 USPQ 303 (CCPA 1974); *In re Kuehl*, 475 F.2d 658, 177 USPQ 250 (CCPA 1973).

The Solicitor argues that Kuehl and its progeny (including Mancy) are distinguishable, "inasmuch as the Court was there concerned with the obviousness of processes of using unobvious products," [\*\*\*6] while here "the person of ordinary skill in the art has already been given the obvious, high purity maltose produced by other processes." However, this factual distinction does not preclude the applicability to the present case of the reasoning of Kuehl, where this court said (*supra* at 664-65, 117 USPQ at 255):

[We] think [*In re Saunders*, 33 CCPA 1001, 154 F.2d 693, 69 USPQ 341 (1946)] no longer represents viable law to the extent that it supports the broad proposition that the obviousness of process claims drawn to a method of using a composition is determined by asking ... whether "given" the composition the claimed process of use would be obvious. The test under § 103 is whether in view of the prior art the invention as a whole

535 F.2d 67, \*69, 1976 CCPA LEXIS 162, \*\*6;  
190 U.S.P.Q. (BNA) 15

would have been obvious at the time it was made, and the prior art here does not include the zeolite [the unobvious composition used] .... [Footnote omitted.]

Similarly here, it is improper to determine obviousness by merely asking whether, given the product of the two unobvious claimed steps, the third claimed step of using the product would have been obvious. The obviousness of the invention as a whole must be determined, and the unobvious [\*\*7] first two steps are clearly part of the invention as a whole.

The Solicitor urges that the board committed no error in refusing to give weight to the specific method of making the high purity maltose. He analogizes the present claims to product-by-process claims, stating that "claim 1 may properly be viewed in short hand [sic] form as a 'process of using a product-by-process' claim," and argues that the method limitations of the first two steps should be given little or no weight. A product-by-process claim, although reciting the subject matter of the claim in terms of how it is made, is still a product claim. As this court said in *In re Brown*, 59 CCPA 1036, 1041, 459 F.2d 531, 535, 173 USPQ 685, 688 (1972):

[In] spite of the fact that the claim may recite only process limitations, it is the patentability of the Product claimed and not of the recited process steps which must be established.

Here, a three-step process is claimed - not the product formed by two steps of the process or the third step of using that product. Thus, the analogy to product-by-process claims is inapposite.<sup>3</sup>

3 At oral hearing, the Solicitor pointed out that some courts in infringement suits have construed

product-by-process claims as covering only a product made by the particular process set forth in the claims (see *In re Bridgeford*, 53 CCPA 1182, 1186 n.5, 357 F.2d 679, 682 n.5, 149 USPQ 55, 58 n.5 (1966)), and argued that these courts would treat the "process of using a product-by-process claim" and the present claims in the same manner. This court, however, as recognized by the Solicitor, does not construe product-by-process claims in an ex parte case as limited to the product formed by the specific process recited. *In re Avery*, 518 F.2d 1228, 186 USPQ 161 (CCPA 1975). If it did, the Solicitor's analogy to product-by-process claims would fall under its own weight.

[\*\*8] [\*70] The Solicitor points to the preamble of claim 1, which recites a "process for preparing foods and drinks sweetened mildly," as showing that the subject matter as a whole involves the use of an old sweetening agent in a very obvious manner. However, the preamble merely recites the purpose of the process; the remainder of the claim (the three process steps) does not depend on the preamble for completeness, and the process steps are able to stand alone. See *Kroppa v. Robie*, 35 CCPA 858, 187 F.2d 150, 88 USPQ 478 (1951). The Solicitor's interpretation of the preamble would improperly broaden the scope of the claim.

In view of the foregoing, we hold that the subject matter as a whole would not have been obvious at the time the invention was made.

The decision of the board is reversed.

REVERSED

LEXSEE 441 F.3D 977

IN RE LEONARD R. KAHN

04-1616 (Serial No. 08/773,282)

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

*441 F.3d 977; 2006 U.S. App. LEXIS 7070; 78 U.S.P.Q.2D (BNA) 1329*

March 22, 2006, Decided

**SUBSEQUENT HISTORY:** Rehearing denied by, Rehearing, en banc, denied by *In re Kahn*, 2006 U.S. App. LEXIS 14563 (Fed. Cir., June 1, 2006)

because the Board did not commit legal error in concluding that the claims would have been obvious, we affirm.

**PRIOR HISTORY:** [\*\*1]Appealed from: United States Patent and Trademark Office, Board of Patent Appeals and Interferences.

*In re Kahn*, 147 Fed. Appx. 187, 2005 U.S. App. LEXIS 23087 (2005)

1 The Board also affirmed its own rejection of claims 21 and 22 as being non-enabled under 35 U.S.C. § 112, *Pl*; however, in his opening brief on appeal Kahn withdrew those claims, leaving only claims 1-20 before us.

[\*\*2] I. BACKGROUND

A. The Invention

John M. Whealan, Solicitor, Office of the Solicitor, United States Patent and Trademark Office, of Arlington, Virginia, for the Director of the United States Patent and Trademark Office. With him on the brief were Linda Moncys Isacson and Raymond T. Chen, Associate Solicitors. Of counsel was Mary L. Kelly.

**JUDGES:** Before MICHEL, Chief Judge, LINN, and PROST, Circuit Judges.

**OPINION BY:** Linn

**OPINION**

[\*980] LINN, *Circuit Judge*.

Leonard R. Kahn ("Kahn") appeals from the final decision of the Board of Patent Appeals and Interferences ("Board") concluding that claims 1-20 in patent application number 08/773,282 ("the '282 application") are unpatentable as obvious under 35 U.S.C. § 103.<sup>1</sup> Because the factual findings underlying the Board's conclusion are supported by substantial evidence, and

The '282 application, filed on December 24, 1996 as a continuation-in-part of a series of continuing applications dating back to 1989, involves a "reading machine" that may be used by the blind. Prior to the application, machines that employed memory and display components by which material could be "read" using hand-held optical pens and speech synthesizers were known in the art. While a user can control these devices by hand to repeat words and to read at various speeds, such control is cumbersome, which makes it difficult for a blind user to study complex publications. Kahn addressed this problem and claims invention in a device that is operated by eye control and sound localization such that it can read out loud the word "looked at" by the user.

Kahn treats claims 1-20 as a group with claim 1 being representative:

1. A reading machine suitable for use by totally blind individuals for reading the complete text, or a selected portion thereof, of a document stored in storage

441 F.3d 977, \*980; 2006 U.S. App. LEXIS 7070, \*\*2;  
78 U.S.P.Q.2D (BNA) 1329

means, at the option of the user, comprising:

(a) means of storing at least a portion of the text of the document to be read,

(b) means for retrieving a selected [\*\*3] portion of said stored text made available for immediate "reading,"

(c) means for producing an acoustical display of the selected portion of said stored text, in a page-like format,

(d) means for determining the location on the acoustical display towards which the user is "looking," and

(e) means for generating speech sounds verbalizing the word that is formatted to appear on the acoustical display at the location the user is "looking" towards.

A preferred embodiment of the '282 patent is illustrated below in Figure 1.

[SEE FIG. 1 IN ORIGINAL]

[\*981] In operation,

the information being "read" . . . is fed through intermediate storage means to speech synthesizer means for converting the written information to electrical waves representing speech sounds. These electric waves are fed to . . . a four speaker array wherein the speakers are located in a fashion so that the artificial sound image can be placed at various points on the artificial screen or page allowing the user to hear the words at the desired locations. These locations would be selected by the user looking at a specific location on the artificial screen or page.

The user would then move his or her [\*\*4] eyes to "look" where the next word would be expected to appear, i.e., directly to the right of the spoken word. This would then cause the next word to be

"spoken" and the sound image would appear slightly to the right. This motion is achieved by energizing the four speaker array with different levels of audio power.

...

When the user completes the "reading" of the last word on the page, . . . the reader would have the option of rereading a section on the page or causing the page to be "turned." If the user wishes to reread . . . , he can direct his attention to the material to be reread by "looking" at the portion of the page where he remembers hearing the material.

On the other hand, if he wishes to continue reading the material he can turn the page by looking along the bottom line past the right hand edge of the "page". The first word on the new page would be heard when the reader directed his or her attention to the upper left hand corner of the page where the first word on the new page would be expected.

'282 application at 11-13.

According to the specification, the device can employ a conventional scanner to input data; a conventional character recognition device [\*\*5] to translate and send data to a storage device; and a page generator to take data from the storage device and format it for a visual display and for a word selector, the latter of which can send the data to a conventional speech synthesizer. After an optical sensor detects where a user is "looking" and a word is "selected" for vocalization, the synthesizer feeds an audio signal to a localizer control. [\*982] Loud speakers are arranged at the corners of the "page" to allow the user to confirm localization of sound. The specification further indicates that

there are a number of devices available for sensing where an individual is looking. For example, *Garwin et. al. 4,595,990* . . . , *Anderson et. al. 4,579,533* . . . and *Stanton 4,322,744* . . . . More specifically, Anderson's [sic] patent discusses feed-back which may be visual, auditory or tactile to verify decisions by eye control

equipment.

However, such inventions are not suitable for totally blind individuals who are not verifying where they are looking but are using their eyes to direct which part of the artificial page should be read to produce a sound image. This makes essential a two dimensional stereo sound stage which the blind [\*\*6] person solely depends upon.

'282 application at 16.

#### B. The Prior Art

The Board's rejection was based on Garwin et al., *U.S. Patent No. 4,595,990* (issued June 17, 1986) ("Garwin"), in view of Anderson et al., *U.S. Patent No. 4,406,626* (issued Sept. 27, 1983) ("Anderson '626"), Anderson et al., *U.S. Patent No. 4,579,533* (issued April 1, 1986) ("Anderson '533"), and Stanton, *U.S. Patent No. 4,322,744* (issued March 30, 1982) ("Stanton"). The Board alternatively used *Anderson '626* or *'533* as primary references.

Garwin discloses an eye-controlled interactive information processor that senses the portion of a visual display at which the user is looking. The processor is connected to the display, which, in turn, can be partitioned so that different information is displayed in discrete areas. By gazing in different directions, the user informs the processor of the displayed item that is selected. Garwin, col. 2, ll. 60-68. The preferred embodiment employs a reflected light eye-tracking device to determine where the user is looking. *Id.*, col. 3, ll. 66-col. 4, l. 62. The eye-interactive control generally uses a technique where the user is presented with a number of targets having [\*\*7] some meaning, such as "words or phrases" displayed on screen. *Id.*, col. 9, ll. 62-67. "Visual, auditory or tactile" feedback is then given to the user to indicate that a selection has been received. *Id.*, col. 2, ll. 10-11; col. 11, ll. 59-64. The user then can verify or cancel the selection. *Id.*, col. 10, ll. 1-6. Garwin states that "it will be apparent to one skilled in the art that . . . the benefits of the invention will be achieved by many types of apparatus." *Id.*, col. 2, ll. 50-53. It can be used for "requesting display of a page of text from a . . . table of contents," *id.*, col. 3, ll. 42-44, or "[other] presentation of textual material," *id.*, col. 10, ll. 31-33.

*Anderson '626* discloses an interactive "electronic teaching aid" which enables a user viewing text on a display to designate any words or portion of text for immediate audible vocalization. *Anderson '626*, col. 1, l. 8; col. 2, ll. 11-17. The components include: a selector switch, which when in the "text" position, causes data to be transmitted to a monitor and displayed in legible form, *id.*, col. 3, ll. 27-31; an advance button, which when depressed allows the user to select and retrieve [\*\*8] the next page of text from memory, *id.*, col. 3, ll. 31-41; a memory, which can store each word of the text coded for speech, *id.*, col. 3, l. 66-col. 4, l. 6; and a word designator light pen, which the user can place on a word to hear the word vocalized through the speaker, *id.*, col. 3, ll. 54-68; col. 10, ll. 51-58. *Anderson '533* discloses an improved microprocessor-based version of *Anderson '626*. *Anderson '533*, col. 1, ll. 19-24, 41-56.

[\*983] Stanton discloses an acoustical imaging system for use by visually impaired individuals that uses horizontal and vertical directional sound to represent visual aspects of an environment. Stanton states that a user can locate "the position of a virtual sound source as representing a point in space" such that different signals may represent different directions. Stanton, col. 1, ll. 58-61. The preferred embodiment features four loud speakers or transducers mounted at the corners of a vertical display panel. *Id.*, col. 2, ll. 54-55. When the user moves the cursor, the sound emanating from the speakers is phase shifted to produce a virtual sound seeming to come from a particular location related to the position of the cursor. *Id.*, col. [\*\*9] 1, l. 66-col. 2, l. 2; col. 2, ll. 55-63. In another embodiment, a quadraphonic headset is used in place of the transducers to achieve the effect of producing a virtual sound identifying a position. *Id.*, col. 4, ll. 26-35. Stanton states that the device may be used as a "rudimentary reading device." *Id.*, col. 1, ll. 62.

#### C. The Board Decisions

Kahn filed the '282 application with 22 claims as a continuation-in-part of application number 07/645,102 ("the '102 application"), which was filed in 1991. The '102 application was a continuation-in-part of a series of abandoned continuing applications dating back to application number 07/338,597, which was filed in 1989. While claims 21 and 22 of the '282 application are not at issue in this appeal, the Board addressed those claims on several occasions, which led to the creation of a substantial Board history. As a result, the final decision

441 F.3d 977, \*983; 2006 U.S. App. LEXIS 7070, \*\*9;  
78 U.S.P.Q.2D (BNA) 1329

with respect to the obviousness rejection of claims 1-20 spans three decisions, which include *Ex Parte Kahn*, No. 2004-1091 (B.P.A.I. June 30, 2004) ("2004 decision"); *Ex Parte Kahn*, No. 2000-1130 (B.P.A.I. Feb. 24, 2003) ("2003 decision"); and *Ex Parte Kahn*, No. 94-2233 (B.P.A. [\*\*10] I. Sept. 21, 1995) ("1995 decision").

In its 1995 decision, after reversing the examiner's anticipation rejection, the Board *sua sponte* rejected the relevant claims under § 103. The Board found that Garwin taught "the concepts of determining where on a display screen a user is 'looking' . . . and giving either visual or *auditory* feedback to the user" and that "while nothing specific is said as to acoustically reproducing a word displayed at that location, common sense . . . indicates that such an *auditory* feedback response is appropriate in view of such auditory feedback confirmation clearly suggested by Anderson '533 or '626." *1995 decision*, slip op. at 5 (emphasis in original). The Board found that "to whatever extent Garwin is not concerned with text *per se*, [the Anderson] references are" and "teach the advantages of text display with audio reproduction," concluding that

the artisan would have found it to have been obvious to have modified Garwin for display of text passages and selection of works therefrom with vocalization thereof as feedback confirmation, all as taught by *Anderson* '626 or '533 . . . [or] to have modified either of these *Anderson* [\*\*11] references to use the eye control of Garwin so that the user's hands would have been free for other tasks.

*Id.*, slip op. at 5-6. The Board found that Stanton "teaches the benefit of acoustic imaging in reading systems" and that "it would have, thus, been further obvious to the artisan to add advantageous acoustic imaging to either of the above-noted modified devices of Garwin or the Anderson patents which would have word positions acoustically and visually indicated." *Id.*, slip op. at 6.

In its 2003 decision, the Board expressly incorporated the findings and rationale [\*\*984] from both its 1995 decision and the Examiner's Answer filed on April 24, 2000. *2003 decision*, slip op. at 3-4. In the Answer, the Examiner had explained that Garwin teaches "a buffer memory which stores at least a portion of the information derived from sensing means and means for

subsequently retrieving the sensed information," "means for displaying stored written text," and "means for determining which word of the displayed text the user is looking towards"; that Anderson '626 teaches "means for generating speech sounds verbalizing the looked at word"; and that Stanton teaches "means for [\*\*12] verbalizing each word the user's eyes are directed towards in two dimensional stereo." Examiner's Answer at 5-6. Rejecting Kahn's argument that hindsight drove the combination of references, the Board reiterated that the rationale of the 1995 decision was correct and explained that motivation "clearly is based upon a prospective look at the state of the art." *2003 decision*, slip op. at 8-11.

The Board addressed several other arguments. First, the Board rejected the argument that the invention's intended use supports patentability, noting that "the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus [from] a prior art apparatus satisfying the claimed structural limitations." *Id.* at 5-6. Second, the Board rejected the argument that because "the purposes of the [prior art] references . . . are different from the [invention's] purpose," the invention is non-obvious, explaining that "the law . . . does not require that references be combined for reasons contemplated by an inventor" and that "prior art need not suggest the same problem set forth by appellant." *Id.* at 6-7. Third, the Board rejected the arguments that [\*\*13] features of a secondary reference be capable of incorporation into the structure of a primary reference and that the invention be suggested completely by one reference. *Id.* at 7. Finally, the Board rejected a "long-felt need" argument, explaining that Khan had not presented any objective evidence of a long-standing problem or long-standing need in the art. *Id.* at 11-12.

In its 2004 decision, the Board entered a final rejection of claims 1-20 based on its 2003 decision. Kahn timely appealed to this court. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A).

## II. DISCUSSION

### A. The Parties' Arguments

Khan advances two main arguments. First, Khan asserts that the Board's finding of motivation to combine was unsupported by substantial evidence. Citing *In re Lee*, 277 F.3d 1338 (Fed. Cir. 2002), and *In re Rouffet*,

441 F.3d 977, \*984; 2006 U.S. App. LEXIS 7070, \*\*13;  
78 U.S.P.Q.2D (BNA) 1329

*149 F.3d 1350 (Fed. Cir. 1998)*, Khan argues that the Board over stated the knowledge of the skilled artisan and employed improper hindsight. Specifically, Khan asserts that a skilled artisan would not have sought to augment Garwin with sound because the resulting device would be more expensive and [\*14] less reliable for the purpose intended by Garwin. He contends that just because Stanton teaches use of sound to confirm a visual perception of a shape like a letter--which provides a "rudimentary" reading capability--does not mean that the reference teaches how to enable a blind user to "read" and "reread" entire words and phrases quickly. Khan further contends that Stanton teaches away from a system that employs iris eye direction sensing because Stanton requires the user to hold his head steady, because eyes are not involved in its localization procedure, and because the combined device would be expensive and inoperable. Second, Khan argues that the court should take "judicial notice" that his [\*985] reading machine addresses a "long-felt, but unresolved need," and that this consideration is sufficient to rebut a *prima facie* case of obviousness.

The Patent and Trademark Office ("PTO") counters that *Lee* and *Rouffet* are distinguishable because here the Board identified motivations to combine the references based on specific statements in the references and on the nature of the problem to be solved. As to long-felt need, the PTO argues that Kahn proffered no actual evidence, and [\*15] that Kahn's argument alone is insufficient to rebut a *prima facie* case.

#### B. Standard of Review

A claimed invention is unpatentable if the differences between it and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the pertinent art. 35 U.S.C. § 103(a) (2000); *Graham v. John Deere Co.*, 383 U.S. 1, 13-14, 86 S. Ct. 654, 15 L. Ed. 2d 545 (1966). The ultimate determination of whether an invention would have been obvious is a legal conclusion based on underlying findings of fact. *In re Dembiczaik*, 175 F.3d 994, 998 (Fed. Cir. 1999). We review the Board's ultimate determination of obviousness *de novo*. *Id.* However, we review the Board's underlying factual findings, including a finding of a motivation to combine, for substantial evidence. *In re Garside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000).

Substantial evidence is something less than the

weight of the evidence but more than a mere scintilla of evidence. *Id.* at 1312 (citing *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229-30, 59 S. Ct. 206, 83 L. Ed. 126 (1938)). [\*16] It means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion. *Consol. Edison*, 305 U.S. at 229-30. In reviewing the record, we must take into account evidence that both justifies and detracts from the factual determinations. *Garside*, 203 F.3d at 1312 (citing *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 487-88, 71 S. Ct. 456, 95 L. Ed. 456 (1951)). We note that the possibility of drawing two inconsistent conclusions from the evidence does not prevent the Board's findings from being supported by substantial evidence. *Id.* Indeed, if a reasonable mind might accept the evidence as adequate to support the factual conclusions drawn by the Board, then we must uphold the Board's determination. *Id.*

#### C. Analysis

In assessing whether subject matter would have been non-obvious under § 103, the Board follows the guidance of the Supreme Court in *Graham v. John Deere Co.* The Board determines "the scope and content of the prior art," "ascertains "the differences between the prior art and the claims at" issue, and resolves "the level of ordinary skill in the pertinent" art. *Dann v. Johnston*, 425 U.S. 219, 226, 96 S. Ct. 1393, 47 L. Ed. 2d 692 (1976) [\*17] (quoting *Graham*, 383 U.S. at 17). Against this background, the Board determines whether the subject matter would have been obvious to a person of ordinary skill in the art at the time of the asserted invention. *Graham*, 383 U.S. at 17. In making this determination, the Board can assess evidence related to secondary indicia of non-obviousness like "commercial success, long felt but unresolved needs, failure of others, etc." *Id.*, 383 U.S. at 17-18, accord *Rouffet*, 149 F.3d at 1355. We have explained that

to reject claims in an application under section 103, an examiner must show an unrebutted *prima facie* case of obviousness . . . . On appeal to the Board, an applicant can overcome a rejection by [\*986] showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.

*Rouffet*, 149 F.3d at 1355.

441 F.3d 977, \*986; 2006 U.S. App. LEXIS 7070, \*\*17;  
78 U.S.P.Q.2D (BNA) 1329

Most inventions arise from a combination of old elements and each element may often be found in the prior art. *Id. at 1357*. However, mere identification in the prior art of each element is insufficient to defeat [\*\*18] the patentability of the combined subject matter as a whole. *Id. at 1355, 1357*. Rather, to establish a *prima facie* case of obviousness based on a combination of elements disclosed in the prior art, the Board must articulate the basis on which it concludes that it would have been obvious to make the claimed invention. *Id.* In practice, this requires that the Board "explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious." *Id. at 1357-59*. This entails consideration of both the "scope and content of the prior art" and "level of ordinary skill in the pertinent art" aspects of the *Graham* test.

When the Board does not explain the motivation, or the suggestion or teaching, that would have led the skilled artisan at the time of the invention to the claimed combination as a whole, we infer that the Board used hindsight to conclude that the invention was obvious. *Id. at 1358*. The "motivation-suggestion-teaching" requirement protects against the entry of hindsight into the obviousness analysis, a problem which § 103 was meant [\*\*19] to confront. *See 35 U.S.C. § 103* (stating that obviousness must be assessed "at the time the invention was made"); *Dembicak*, 175 F.3d at 998 ("It is this phrase that guards against entry into the tempting but forbidden zone of hindsight." (internal quotations omitted)); *Giles S. Rich, Laying the Ghost of the Invention Requirement*, 1 APLA Q.J. 26-45 (1972), reprinted in 14 *Fed. Cir.* B.J. 163, 170 (2004) ("To protect the inventor from hindsight reasoning, the time is specified to be *the time when the invention was made*.") (emphasis in original). The Supreme Court recognized the hindsight problem in *Graham* and proposed that "legal inferences" resulting from "secondary considerations" might help to overcome it. 383 U.S. at 36 ("[Secondary considerations] may also serve to guard against slipping into use of hindsight, and to resist the temptation to read into the prior art the teachings of the invention in issue." (internal quotations omitted)). By requiring the Board to explain the motivation, suggestion, or teaching as part of its *prima facie* case, the law guards against hindsight [\*\*20] in all cases--whether or not the applicant offers evidence on secondary considerations--which advances Congress's goal of creating a more practical, uniform, and definite test for

patentability. *See Damm*, 425 U.S. at 225-26 ("It was only in 1952 that Congress, in the interest of 'uniformity and 'definiteness,' articulated the requirement in a statute." (quoting S. Rep. No. 1979, at 6 (1952); H.R. Rep. No. 1923, at 7 (1952)); *Graham*, 383 U.S. at 17 ("The § 103 [test], when followed realistically, will permit a more practical test of patentability.").

Although our predecessor court was the first to articulate the motivation-suggestion-teaching test, a related test--the "analogous art" test--has long been part of the primary *Graham* analysis articulated by the Supreme Court. *See Damm*, 425 U.S. at 227-29; *Graham*, 383 U.S. at 35.<sup>2</sup> The [\*\*987] analogous-art test requires that the Board show that a reference is either in the field of the applicant's endeavor or is reasonably pertinent to the problem with which the inventor was concerned in order to rely on that reference as a basis for rejection. *In re Detiker*, 977 F.2d 1443, 1447 (*Fed. Cir.* 1992). [\*\*21] References are selected as being reasonably pertinent to the problem based on the judgment of a person having ordinary skill in the art. *Id.* ("It is necessary to consider 'the reality of the circumstances, in other words, common sense--in deciding in which fields a person of ordinary skill would reasonably be expected to look for a solution to the problem facing the inventor." (quoting *In re Wood*, 599 F.2d 1032, 1036 (C.C.P.A. 1979))). We have explained that this test begins the inquiry into whether a skilled artisan would have been motivated to combine references by defining the prior art relevant for the obviousness determination, and that it is meant to defend against hindsight. *See id.*; *In re Clay*, 966 F.2d 656, 659-60 (*Fed. Cir.* 1992).<sup>3</sup>

2 In *Graham*, Cook Chemical challenged the court's reliance on a reference that it believed was not in a "pertinent prior art," arguing that while the invention involved a container having a "pump sprayer," the reference related to containers having "pouring spouts." 383 U.S. at 35. In reaching the conclusion that the claimed subject matter was obvious, the Court rejected Cook's argument, explaining that the problem to be solved was a mechanical closure problem and that a closure device in such a closely related art was a pertinent reference. *Id.* Similarly, in *Damm*, the invention involved the use of automatic data processing equipment to analyze transactions within a single bank account. 425 U.S. at 227-28. The *Dirk* reference that the Court relied upon in

441 F.3d 977, \*987; 2006 U.S. App. LEXIS 7070, \*\*21;  
78 U.S.P.Q.2D (BNA) 1329

making its obviousness case involved a similar system used in a non-banking context. *Id.* at 228. Citing *Graham*, the Court explained that a person of ordinary skill in the art would be aware of this reference and the Court could rely upon it in making its obviousness case because "while the Dirk's invention is not designed specifically for application to the banking industry many of its characteristics and capabilities are similar to those of respondent's system." *Id.* at 229.

[\*\*22]

3 In *In re Clay*, we reasoned that

if a reference disclosure has the same purpose as the claimed invention, the reference relates to the same problem, and that fact supports use of that reference in an obviousness rejection. An inventor may well have been motivated to consider the reference when making his invention. If it is directed to a different purpose, the inventor would accordingly have had less motivation or occasion to consider it.

966 F.2d at 659-60. In *In re Oetiker*, we held that "the combination of elements from non-analogous sources, in a manner that reconstructs the applicant's invention only with the benefit of hindsight, is insufficient to present a *prima facie* case of obviousness." 977 F.2d at 1447.

The motivation-suggestion-teaching test picks up where the analogous art test leaves off and informs the *Graham* analysis. To reach a non-hindsight driven conclusion as to whether a person having ordinary skill in the art at the time of the invention would have viewed the subject matter as a whole to have been obvious in view of multiple references, the Board must provide some rationale, articulation, [\*\*23] or reasoned basis to explain why the conclusion of obviousness is correct. The requirement of such an explanation is consistent with governing obviousness law, see § 103(a); *Graham*, 383 U.S. at 35; *Damm*, 425 U.S. at 227-29, and helps ensure predictable patentability determinations.

A suggestion, teaching, or motivation to combine the relevant prior art teachings does not have to be found

explicitly in the prior art, as

the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references. . . . The test for an implicit [\*988] showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art.

*In re Kotzab*, 217 F.3d 1365, 1370 (Fed. Cir. 2000) (internal citations omitted). However, rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *See Lee*, 277 F.3d at 1343-46, [\*24] *Rouffet*, 149 F.3d at 1355-59. This requirement is as much rooted in the Administrative Procedure Act, which ensures due process and non-arbitrary decisionmaking, as it is in § 103. *See id.* at 1344-45.

In considering motivation in the obviousness analysis, the problem examined is not the specific problem solved by the invention but the general problem that confronted the inventor before the invention was made. *See, e.g.*, *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1323 (Fed. Cir. 2005) ("One of ordinary skill in the art need not see the identical problem addressed in a prior art reference to be motivated to apply its teachings."); *Ecologchem, Inc. v. S. Cal. Edison Co.*, 227 F.3d 1361, 1372 (Fed. Cir. 2000) ("Although the suggestion to combine references may flow from the nature of the problem, 'defining the problem in terms of its solution reveals improper hindsight in the selection of the prior art relevant to' obviousness. (internal citation omitted) (quoting *Monarch Knitting Mach. Corp. v. Sulzer Morai GmbH*, 139 F.3d 877, 881 (Fed. Cir. 1998)); *In re Beattie*, 974 F.2d 1309, 1312 (Fed. Cir. 1992) [\*25] ("The law does not require that the references be combined for the reasons contemplated by the inventor."); *Princeton Biochemicals, Inc. v. Beckman Coulter, Inc.*, 411 F.3d 1332, 1337 (Fed. Cir. 2005) (characterizing the relevant inquiry as "[would] an artisan of ordinary skill in the art at the time of the invention, confronted by the same problems as the inventor and with no knowledge of the

claimed invention,[] have selected the various elements from the prior art and combined them in the manner claimed"); *see also Graham, 383 U.S. at 35* (characterizing the problem as involving mechanical closures rather than in terms more specific to the patent in the context of determining the pertinent prior art). Therefore, the "motivation-suggestion-teaching" test asks not merely what the references disclose, but whether a person of ordinary skill in the art, possessed with the understandings and knowledge reflected in the prior art, and motivated by the general problem facing the inventor, would have been led to make the combination recited in the claims. *See Cross Med. Prods., 424 F.3d at 1321-24.* From this it may be determined whether [\*\*26] the overall disclosures, teachings, and suggestions of the prior art, and the level of skill in the art—*i.e.*, the understandings and knowledge of persons having ordinary skill in the art at the time of the invention—support the legal conclusion of obviousness. *See Princeton Biochemicals, 411 F.3d at 1338* (pointing to evidence supplying detailed analysis of the prior art and the reasons one of ordinary skill would have possessed the knowledge and motivation to combine).

In this case, Khan does not dispute that each element of his claimed invention can be found in either Garwin, Anderson '533 and '626, or Stanton, or that each reference lies in the pertinent art. Nor does Khan take issue with the Board's finding that a person having ordinary skill in the art would have been motivated to modify Anderson '533 or '626 in view of [\*\*89] Garwin, or vice versa. *See Garwin, col. 2, ll. 50-53, col. 10, ll. 31-35* (stating that "it will be apparent to one skilled in the art that . . . the benefits of the invention will be achieved by many types of apparatus" which may be "virtually [any device] susceptible of control by a computer, including . . . [those geared] to presentation [\*\*27] of textual material").

Rather, Khan's challenge to the sufficiency of the evidence supporting the Board's *prima facie* case is directed at the motivation to apply the teachings of Stanton to achieve the claimed invention. In the 1995 decision, the Board found that Stanton "teaches the benefit of acoustic imaging in reading systems." The Board carefully examined the Anderson/Garwin combination and recognized that a skilled artisan confronted with the problem faced by Kahn would have been led by the teaching of Stanton "to add advantageous acoustic imaging" to the Anderson/Garwin combination so that it would have "word positions acoustically and

visually indicated."

Stanton teaches that "[its] invention relates to augmentation of vision of those who have lost vision or have had their visual faculties diminished," col. 1, ll. 6-8, that it is "useful in teaching a deprive to apprehend the position of a virtual sound source as representing a point in space," *id.*, ll. 58-59, and that it may be used as a "rudimentary reading device," *id.*, ll. 61-62. A skilled artisan, who knows of a "learning machine" that is capable of reading a word aloud by selecting the word on the screen [\*\*28] at which the user is looking and seeks to provide a visually-impaired user better control over word localization,<sup>4</sup> would have reason to solve that problem by adding two-dimensional sound in view of Stanton's express teaching that two-dimensional sound can be used to "substitute" for the lost sense of sight, to locate a point in space, and to create a "rudimentary reading device" for the visually impaired. *See Cross Med. Prods., 424 F.3d at 1323* (holding that "one of ordinary skill in the art need not see the identical problem addressed in a prior art reference to be motivated to apply its teachings"). Because the Board need only establish motivation to combine by a preponderance of the evidence to make its *prima facie* case, *see In re Glaug, 283 F.3d 1335, 1338 (Fed. Cir. 2002)*, we conclude that substantial evidence supports the finding of a motivation to combine the teachings of Stanton to the Anderson/Garwin combination. Although a reasonable person might reach the opposite conclusion, there is far more than a "mere scintilla" of evidence present from which a reasonable mind could find a motivation to combine.

4 Kahn does not argue that one of ordinary skill in the art at the time of the invention would be unaware of the nature of this problem, and there is nothing in the record to suggest this to be the case, unlike the facts in the decision of our predecessor court in *In re Sponnole, 56 C.C.P.A. 823, 405 F.2d 578 (C.C.P.A. 1969)*.

[\*\*29] We reject Khan's argument that the Board overstated the knowledge of the person having ordinary skill in the art or employed improper hindsight in making its *prima facie* case. In both *Lee* and *Rouffet*, the Board recognized that the knowledge of the skilled artisan could provide the motivation to combine but concluded that no such knowledge was articulated and placed on the record. *Lee, 277 F.3d at 1343-45; Rouffet, 149 F.3d at 1357-59.*

441 F.3d 977, \*989; 2006 U.S. App. LEXIS 7070, \*\*29;  
78 U.S.P.Q.2D (BNA) 1329

In this case, motivation to combine was articulated and placed on the record. As to the Anderson/Garwin combination, the Board identified the desire to free up the hands of the Anderson user as the problem confronted and found that Garwin itself evidenced the broad applicability of its optical [\*990] controls to the claimed invention. As to the addition of Stanton, the Board identified express teachings in Stanton of "the benefit of acoustic imaging in reading systems" and properly related those teachings to the Anderson/Garwin combination.

We find Khan's remaining arguments unpersuasive. First, even if applying Stanton to Garwin resulted in a device that would be less effective for the purpose intended by Garwin, [\*30] the teaching of the Garwin reference is not limited to the specific invention disclosed. *See In re Heck*, 699 F.2d 1331, 1333 (Fed. Cir. 1983) (explaining that "the use of patents as references is not limited to what the patentees describe as their own inventions" (internal quotations omitted)). As noted above, Garwin states that his invention is intended to be applied to "virtually [any device] susceptible of control by a computer, including . . . [those geared] to presentation of textual material," Garwin, col. 2, ll. 50-53; col. 10, ll. 31-35. Second, although Khan may have envisioned something different than the skilled artisan when he looked at Stanton because Stanton teaches only a *rudimentary* reading device, the skilled artisan need not be motivated to combine Stanton for the same reason contemplated by Khan. *See In re Beattie*, 974 F.2d 1309, 1312 (Fed. Cir. 1992) ("As long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, the law does not require that the references be combined for the reasons contemplated by the inventor." (citing *In re Kronig*, 539 F.2d 1300, 1304 (C.C.P.A. 1976))). [\*31] Third, Khan's argument that Stanton itself teaches away from the combination with Garwin lacks support in the reference. "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). Nothing in Stanton can be said to discourage a person having

ordinary skill in the art from using the visual-input control taught in Garwin in the claimed combination or to lead the skilled artisan in a direction divergent from the path taken by Kahn.

Finally, we note that Kahn had an opportunity to rebut the Board's *prima facie* case by offering evidence of objective indicia of non-obviousness. Khan put on no evidence, but invites this court to take "judicial notice" of the long-felt but unresolved need for a device that will help the blind read. We must decline Khan's invitation for the following reasons. First, "long-felt but unresolved need" is not the kind of undisputed fact to which courts are accustomed to taking "judicial notice" because [\*32] a finding either way can "reasonably be questioned." *See Fed. R. Evid. 201(b)* ("A judicially noticed fact must be one not subject to reasonable dispute in that it is either (1) generally known within the territorial jurisdiction of the trial court or (2) capable of accurate and ready determination by resort to sources whose accuracy cannot reasonably be questioned."); *In re Fielder*, 471 F.2d 640, 642-43 (C.C.P.A. 1973) (declining to take judicial notice of prior art references that appellant submitted as objective evidence of non-obviousness because appellant did not offer references to the Board and they were not part of the record). Second, our precedent requires that the applicant submit actual evidence of long-felt need, as opposed to argument. This is because "absent a showing of long-felt need or the failure of others, the mere passage of time without the claimed invention is not evidence of nonobviousness." *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 [\*991] (Fed. Cir. 2004); *accord In re Wright*, 569 F.2d 1124, 1127 (C. C.P.A. 1977).

### III. CONCLUSION

Because the factual findings [\*33] underlying the Board's analysis, including the findings on motivation to combine, are supported by substantial evidence, we conclude that the Board did not err in rejecting claims 1-20 as *prima facie* obvious. Because Khan did not rebut the Board's *prima facie* case, the Board's decision is

*AFFIRMED.*

LEXSEE 526 F.2D 1399

IN THE MATTER OF THE APPLICATION OF ERIK REGEL, KARL HEINZ  
BUCHEL and MANFRED PLEMPPEL

Patent Appeal No. 75-570

UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

526 F.2d 1399; 1975 CCPA LEXIS 102; 188 U.S.P.Q. (BNA) 136

December 18, 1975, Decided.

PRIOR HISTORY: [\*\*1] Serial No. 873,098.

R(1) is hydrogen, alkyl of 1 to 4 carbon atoms or phenyl,

OPINION BY: BALDWIN

R(2) and R(3) are the same or different and are hydrogen, alkyl of 1 to 4 carbon atoms or phenyl,

OPINION

[\*1399] BALDWIN, Judge.

[\*\*2] X and Y are the same or different and are halogen, NO(2), CN, alkyl of 1 to 12 carbon atoms,

This is an appeal from the decision of the Patent and Trademark Office Board [\*1400] of Appeals affirming the examiner's rejection of claims 2, 6 and 19<sup>1</sup> of appellants' application<sup>2</sup> entitled "Bis-imidazolyl-bisphenylmethane, Salts Thereof and Processes for Their Production." We reverse.

S-alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms, and

1. Claim 19 was rejected under 35 USC 112, second paragraph. Further discussion of this claim is unnecessary. Appellants have withdrawn their appeal of claim 19 by motion dated June 5, 1975.

2. Serial No. 873,098, filed October 31, 1969.

m is 0, 1 or 2, and

n is 1 or 2 or m is 1 or 2 and n is 0, 1 or 2.

6. A compound according to claim 2 wherein R(1) is hydrogen or alkyl of 1 to 4 carbon atoms, R(2) and R(3) are hydrogen, X and Y are the same or different and are halogen, CN, NO(2), methoxy or methyl and n is 0 or 1.

References

Fournari et al., Bull. Soc. Chim. France, No. 356 (1968), pages 2438-46 (hereafter Fournari).

Mussell et al. 3,321,366 May 23, 1967 (filed Nov. 15, 1965) (hereafter Mussell).

Tolkmith et al., Science, Vol. 158 (1967), pages 1462-63 (hereafter Tolkmith).

Appellants claim certain derivatives of bis-imidazolyl-bisphenylmethane which are disclosed as being non-toxic and pharmaceutically acceptable antimycotics especially useful against dermatomycosis and also against yeast infections of the skin and internal organs. The claims on appeal are as follows:

2. A compound of the formula:

[Graphic omitted. See illustration in original.]

wherein

Fournari discloses various methods of preparing N-substituted imidazole derivatives. Once prepared, the spectra of the various imidazoles were analyzed to determine the exact chemical structures of the compounds. Of the numerous materials studied, three

were found of particular interest by the Patent and Trademark Office in formulating its rejection (which will be discussed in detail):

[Graphic omitted. See illustration in original.]

[\*1401] Mussell [\*3] discloses the use of certain substituted tritylimidazole compounds <sup>4</sup> "for the control of a wide range of fungi, especially those fungal organisms ordinarily found on the aerial portions of plants." In addition, Mussell teaches that:

4 Mussell's tritylimidazoles are taught to have the following generic structure:

[Graphic omitted. See illustration in original.]

wherein each R independently represents a member selected from the group consisting of halo and lower alkyl and n represents an integer of from 0 to 2, both inclusive, further limited in that one of the 2 and 6 positions is unsubstituted; and each X independently represents hydrogen, lower alkyl, or phenyl, the total number of carbon atoms in all X substituents being an integer of from 0 to 15, both inclusive.

It is an advantage of the present invention that compositions containing these compounds can be applied to growing vegetation in amounts required for effective control without significant injury to the plants. It is a further advantage that the compounds of the present invention are of very low toxicity to mammals.

Last, the Tolkmith article presents the results of a study of certain substituted imidazoles [\*4] and concludes that:

[Imidazoles] substituted on the imine nitrogen atom are likely to be active if the substituent is electron-attracting, and if the atom connecting it to the imidazolyl moiety has tetrahedral geometry. Fungitoxicity is high with phosphoranimidothionate and triarylmethyl groups as substituents. The presence of an asymmetric phosphorus atom in the substituent has no effect on fungitoxicity, but affects mammalian toxicity.

Tolkmith began by studying the properties of N,N-diethyl imidazol-1-yl phenylphosphoranimidothionate <sup>5</sup> and noted that it "showed high fungitoxicity, low mammalian toxicity, and very little anticholinergic

activity." It was then hypothesized that the fungitoxic action of the above-recited compound should not be drastically changed if the entire phosphoranimidothionate group were replaced by a phosphorus-free substituent of equivalent stereoelectronic nature. In order to test this hypothesis, several materials were tested, including:

5 [Graphic omitted. See illustration in original.]

[Graphic omitted. See illustration in original.]

The tritylimidazole was found to be nearly as active as the reference compound, while demonstrating [\*5] "moderate mammalian toxicity."

#### The Rejection

The board affirmed the examiner's rejection of claims 2 and 6 as being unpatentable (35 USC 103) over (1) Fournari, (2) Fournari in view of Mussell, and (3) Fournari in view of Mussell and Tolkmith. Noting that Fournari does not disclose any utility for the compounds recited therein, the board stated:

At the outset we point out that appellants' invention (i.e., that which is claimed) is a chemical compound or group of compounds; it is not the method of using the compound or of treating humans or animals infected with pathogenic fungi.

[\*1402] Our consideration of the references convinces us that not only would the claimed alkyl or methyl analogue have been obvious, its usefulness as a fungicide also would have been equally obvious. For example, Tolkmith et al. indicate that the fungicidal activity is primarily due to the imidazole moiety of the compound and that the remainder of said compound (a triphenylmethyl group in the case of compound II) "is not in fact critical for high fungicidal activity." Mussell et al. additionally indicate that in imidazole-substituted phenylmethane fungicides both the methyl-substituted phenyl [\*6] and unsubstituted phenyl derivatives possess fungicidal activity. Consequently anyone skilled in the art would expect not only the Fournari et al. bis-imadazolyl-bisphenylmethane to possess fungicidal activity but would also expect similar activity for the corresponding methyl-substituted analogue.

\*\*\*

Regarding appellants' argument based on the fact that the art does not suggest the treatment of fungal

526 F.2d 1399, \*1402; 1975 CCPA LEXIS 102, \*\*6,  
188 U.S.P.Q. (BNA) 136

infections pathogenic to human beings and other animals, it is the Examiner's position that this fact, under the circumstances herein, is not significant. As we have set forth above, the claimed methyl analogue of the Fournari et al. bis-imidazolyl-bisphenylmethane, as well as its use as a fungicide would have been obvious from the art of record. In other words this means that the claimed methyl analogue, as well as its use as a fungicide, would have already been in the possession of the public at the time appellants made their invention. The fact that appellants may have discovered a new specific use for that which is already in the possession of the public does not entitle them to a patent thereon. In effect appellants seek to exclude the public from the use of a chemical [\*7] compound for any purpose including the use as a fungicide (e.g., as against Phytophthora infestans, Diplocarpon rosae, Sphaerotheca panosss, Erysiphe cichoracearum) when said compound and its use are already in the public domain; *Monsanto Company v. Rohm and Haas Company, supra* (164 USPQ at 565, 566).

On reconsideration, it added:

We remain of the view that appellants have not established in this record any unobvious properties of the claimed class of compounds as a whole nor have they established any unexpected improvement in properties not possessed by the art compounds.

In response to these rejections, appellants submitted to the Patent and Trademark Office two declarations under Rule 132. The first attempted to establish unexpected properties of the methyl analogue of bis-imidazolyl-bisphenylmethane as compared to the corresponding unsubstituted imidazole. The second was submitted by appellants with their reply brief before the board; it was not considered "since it has not been indicated nor seen to be limited to new points of argument in the Examiner's Answer." No further discussion of these declarations is deemed necessary as neither is relied upon in rendering our [\*8] decision.

#### Opinion

As quoted, *supra*, the board raised the point that appellants' invention (i.e., that which is claimed) is a chemical compound or group of compounds, not the method of using them in treating humans or animals infected with pathogenic fungi. However, this court on numerous occasions has held that a compound and its

properties are inseparable. *In re Albrecht*, 514 F.2d 1389, 185 USPQ 585 (CCPA 1975); *In re Murch*, 59 CCPA 1277, 464 F.2d 1051, 175 USPQ 89 (1972); *In re Stemnicki*, 58 CCPA 1410, 44 F.2d 351, 170 USPQ 343 (1971); *In re Papesch*, 50 CCPA 1084, 315 F.2d 381, 137 USPQ 43 (1963). A finding of unobviousness in consequence depends on comparing the old and new compounds as wholes, inclusive of their properties. *In re Albrecht, supra*.

Although the board affirmed the rejection of claims 2 and 6 as being [\*1403] obvious in view of (1) Fournari, (2) Fournari in view of Mussell, and (3) Fournari in view of Mussell and Tolkmith, we will restrict our discussion to the last-recited rejection - clearly the Office's strongest position. This assumes that the three cited references are combinable, an assumption that we will make, although not without reservation. [\*9] <sup>6</sup>

6 As we have stated in the past, there must be some logical reason apparent from positive, concrete evidence of record which justifies a combination of primary and secondary references. *In re Stemnicki, supra*. Further, as we stated in *In re Bergel*, 48 CCPA 1102, 1105, 292 F.2d 955, 956, 130 USPQ 206, 208 (1961):

The mere fact that it is possible to find two isolated disclosures which might be combined in such a way to produce a new compound does not necessarily render such production obvious unless the art also contains something to suggest the desirability of the proposed combination.

In the present case, it may reasonably be argued that because Fournari discloses no suggestion of utility for the compounds recited therein, one of ordinary skill in the art would not be prompted to combine this reference with either Mussell or Tolkmith.

Fournari discloses numerous compounds, one of which happens to be bis-imidazolyl-bisphenylmethane. The solicitor characterized this compound as the "parent" of the compounds encompassed by the appealed claims. We read this to imply that when a hindsight selection of possible "R's", "X's", "Y's", "m's" and "n's" is made in appellant's [\*10] claims 2 and 6, it can be made to appear that Fournari differs from appellants' claimed compounds by an alkyl group on one of the phenyl radicals. Therefore, we are faced with the question

whether the secondary references, i.e., Mussell and Tolkmith, disclose enough to render obvious that which is missing in Fournari - the missing alkyl substitution.

Mussell only discloses tritylimidazole compounds. Although the patentees do teach unsubstituted and lower alkyl substituted phenyl radicals, the imidazoles disclosed are those possessing a single imidazole group and three phenyl groups. Furthermore, notwithstanding the board's characterization of Mussell's compounds as possessing "fungicidal activity," we find that such activity is limited to the control of fungi found on plants. As stated by Mussell:

It has been discovered that the tritylimidazole compounds are particularly adapted to be employed for the control of a wide range of fungi, especially those fungal organisms ordinarily found on the aerial portions of plants such as, for example, cherry leaf spot, black spot, apple scab, rice blast, powdery mildew, *Helminthosporium* (leaf spot on grasses, cereals, and corn), and late [\*\*11] blight. The compounds can also be applied in dormant applications to the woody surfaces of plants or to orchard floor surfaces for the control of the overwintering spores of many fungi. In addition, the tritylimidazole compounds can be applied to seeds to protect the seeds from the attack of fungal organisms such as rot and mildew. Also, the tritylimidazole compounds can be distributed in soil at fungicidal concentrations to control the organisms which attack seeds and plant roots, particularly the fungal organisms of root rot and mildew.

Tolkmith represents a rather complex study, clearly directed towards a theoretician. The results of the study, presented in abstract form, are as follows:

Abstract. Study of several new types of fungitoxic derivatives of imidazole reveals that imidazoles substituted on the imine nitrogen atom are likely to be active if the substituent is electron-attracting, and if the atom connecting it to the imidazolyl moiety has tetrahedral geometry. Fungitoxicity is high with phosphinamidothionate and triaryl methyl groups as substituents. The presence of an asymmetric phosphorus atom in the substituent has no effect on fungitoxicity, but affects mammalian [\*\*12] toxicity.

Both the solicitor and the board rely on Tolkmith for its alleged conclusion that fungicidal activity is primarily due [\*1404] to the imidazole moiety. Although we can

find no such verbatim statement in Tolkmith, we surmise that the following language is that which the board had in mind:

[Fungitoxic] action seemed more likely to result from the nucleophilicity of I<sup>7</sup>, that is, from the power of the azole nitrogen of the imidazolyl group to attack an electrophilic site in the fungus organism by donating electrons to this site.

#### 7 Compound I of Tolkmith is as follows:

[Graphic omitted. See illustration in original.]

Our reading of Tolkmith leads us to a different conclusion.

Tolkmith presents four compounds which were studied for fungicidal activity. All four possess imidazole moieties, but only compound II, an unsubstituted tritylimidazole, was "nearly as active" as the reference compound N,N-diethylimidazol-1-yl phenylphosphinamidothionate - two others "were markedly less fungicidal." The only conclusion presented in the Tolkmith article is that imidazoles substituted on the imine nitrogen atom are likely to be active if the substituent is [\*\*13] electron-attracting, and if the atom connecting it to the imidazolyl moiety has tetrahedral geometry.

Last, Tolkmith's disclosed utility for the active compounds studied is that of "foliage fungicides." Compound II, relied upon by the board, is taught by Tolkmith to have "[shown] moderate mammalian toxicity."

When we combine the information gleaned from each reference, we are apprised of the following. First, methanes substituted with one, two or three unsubstituted imidazolyls and one, two or three unsubstituted phenyls are known (Fournari). Second, tritylimidazoles with lower alkyl substitution on the phenyl moieties are known as fungicides for plants (Mussell). Third, imidazoles substituted on the imine nitrogen atom are likely to be active foliage fungicides if the substituent is electron-attracting, and if the atom connecting it to the imidazolyl moiety has tetrahedral geometry (Tolkmith). Fourth, and last, tritylimidazole is an active foliage fungicide that exhibits moderate mammalian toxicity (Tolkmith).

526 F.2d 1399, \*1404; 1975 CCPA LEXIS 102, \*\*13;  
188 U.S.P.Q. (BNA) 136

We cannot agree with the board that the information derived from the references, taken as a whole, would render obvious claims 2 and 6 which are directed toward [\*\*14] substituted bisimidazolyl-bisphenylmethanes disclosed as being pharmaceutically acceptable and useful as antimycotics especially against dermatomycosis

caused by Trichophyton and Microsporium species and also against yeast infections of the skin and internal organs. Accordingly, the decision of the board is reversed.

REVERSED

LEXSEE 149 F.3D 1350

IN RE DENIS ROUFFET, YANNICK TANGUY and FREDERIC BERTHAULT

97-1492

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

*149 F.3d 1350; 1998 U.S. App. LEXIS 16414; 47 U.S.P.Q.2d (BNA) 1453*

July 15, 1998, Decided

**PRIOR HISTORY:** [\*\*1]Appealed from: Patent and Trademark Office Board of Patent Appeals and Interferences. (Serial No. 07/888,791).

**DISPOSITION:** REVERSED.

**COUNSEL:** Richard C. Turner and Grant K. Rowan, Sughrue, Mion, Zinn, Macpeak & Seas, PLLC, of Washington, DC, argued for appellants.

David J. Ball, Jr., Associate Solicitor, Office of the Solicitor, Patent and Trademark Office, of Arlington, Virginia, argued for appellee. With him on the brief were Nancy J. Linck, Solicitor, Albin F. Drost, Deputy Solicitor, and Craig R. Kaufman, Associate Solicitor. Of counsel was Scott A. Chambers, Associate Solicitor, Office of the Solicitor.

**JUDGES:** Before PLAGER, Circuit Judge, ARCHER, Senior Circuit Judge, and RADER, Circuit Judge.

**OPINION BY:** RADER

**OPINION**

[\*1352] RADER, Circuit Judge.

Denis Rouffet, Yannick Tanguy, and Frederic Berthault (collectively, Rouffet) submitted application 07/888,791 (the application) on May 27, 1992. The Board of Patent Appeals and Interferences (the Board) affirmed final rejection of the application as obvious under 35 U.S.C. § 103(a). See Ex parte Rouffet, No. 96-1553 (Bd. Pat. App. & Int. Apr. 16, 1997). Because the Board reversibly erred in identifying a motivation to combine the references, this [\*\*2] court reverses.

I.

Satellites in a geosynchronous or geostationary orbit remain over the same point on the Earth's surface. Their constant position above the Earth's surface facilitates communications. These satellites project a number of beams to the Earth. Each beam transmits to its area of coverage, or footprint, on the Earth's surface. In order to provide complete coverage, adjacent footprints overlap slightly and therefore must use different frequencies to avoid interference. However, two or more non-overlapping footprints can use the same set of frequencies in order to use efficiently the limited radio spectrum. Figure 1 from the application shows the coverage of a portion of the Earth's surface provided by multiple cone shaped beams:

[\*1353] [SEE FIGURE 1 IN ORIGINAL]

Frequency reuse techniques, however, have a limited ability to compensate for congestion in geostationary orbits. To alleviate the orbit congestion problem, new telecommunications systems use a network of satellites in low Earth orbit. When viewed from a fixed point on the Earth's surface, such satellites do not remain stationary but move overhead. A satellite's motion as it transmits a plurality of cone-shaped beams [\*\*3] creates a new problem. The satellite's movement causes a receiver on the Earth's surface to move from the footprint of one beam into a second beam transmitted by the same satellite. Eventually, the satellite's motion causes the receiver to move from the footprint of a beam transmitted by one satellite into the footprint of a beam transmitted by a second satellite. Each switch from one footprint to another creates a "handover" event analogous to that which occurs when a traditional cellular phone travels from one cell to another. Handovers are undesirable

because they can cause interruptions in signal transmission and reception.

Rouffet's application discloses technology to reduce the number of handovers between beams transmitted by the same satellite. In particular, Rouffet eliminates handovers caused solely by the satellite's motion. To accomplish this goal, Rouffet changes the shape of the beam transmitted by the satellite's antenna. Rouffet's satellites transmit fan-shaped beams. A fan beam has an elliptical footprint. Rouffet aligns the long axis of his beams parallel to the direction of the satellite's motion across the Earth's surface. By elongating the beam's footprint in the [\*\*4] direction of satellite travel, Rouffet's invention ensures that a fixed point on the Earth's surface likely will remain within a single footprint until it is necessary to switch to another satellite. Because Rouffet's invention does not address handovers caused by the motion of the receiver across the Earth's [\*\*1354] surface, his arrangement reduces, but does not eliminate, handovers. Figure 3 from the application shows the footprints 12 from six beams aligned in the direction of satellite motion 15:

[SEE FIGURE 3 IN ORIGINAL]

The application contains ten claims that stand or fall as a group. Claim 1 is representative:

A low orbit satellite communications system for mobile terminals, wherein the communications antenna system of each satellite provides isoflux coverage made up of a plurality of fan beams that are elongate in the travel direction of the satellite.

The examiner initially rejected Rouffet's claims as unpatentable over U.S. Pat. No. 5,199,672 (King) in view of U.S. Pat. No. 4,872,015 (Rosen) and a conference report entitled "A Novel Non-Geostationary Satellite Communications System," Conference Record, International Conference on Communications, [\*\*5] 1981 (Ruddy). On appeal to the Board, the examiner added an alternative ground for rejection, holding that the claims were obvious over U.S. Pat. No. 5,394,561 (Freeburg) in view of U.S. Pat. No. 5,170,485 (Levine).

On April 16, 1997, the Board issued its decision. Because Rouffet had specified that the claims would

stand or fall as a group based on the patentability of claim 1, the Board limited its opinion to that claim. The Board unanimously determined that the examiner had properly rejected claim 1 as obvious over King in view of Rosen and Ruddy. The Board, on a split vote, also affirmed the rejection over Freeburg in view of Levine.

[\*1355] II

To reject claims in an application under section 103, an examiner must show an unrebutted *prima facie* case of obviousness. See *In re Deuel*, 51 F.3d 1552, 1557, 34 U.S.P.Q.2D (BNA) 1210, 1214 (Fed. Cir. 1995). In the absence of a proper *prima facie* case of obviousness, an applicant who complies with the other statutory requirements is entitled to a patent. See *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2D (BNA) 1443, 1444 (Fed. Cir. 1992). On appeal to the Board, an applicant can overcome a rejection by showing insufficient evidence of *prima* [\*\*6] *facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness. See id.

While this court reviews the Board's determination in light of the entire record, an applicant may specifically challenge an obviousness rejection by showing that the Board reached an incorrect conclusion of obviousness or that the Board based its obviousness determination on incorrect factual predicates. This court reviews the ultimate determination of obviousness as a question of law. See *In re Lueders*, 111 F.3d 1569, 1571, 42 U.S.P.Q.2D (BNA) 1481, 1482 (Fed. Cir. 1997). The factual predicates underlying an obviousness determination include the scope and content of the prior art, the differences between the prior art and the claimed invention, and the level of ordinary skill in the art. See *Monarch Knitting Mach. Corp. v. Sulzer Morai GmbH*, 139 F.3d 877, 881, 45 U.S.P.Q.2D (BNA) 1977, 1981 (Fed. Cir. 1998). This court reviews the Board's factual findings for clear error. See *In re Zurko*, 142 F.3d 1447, 1449, 46 U.S.P.Q.2D (BNA) 1691, 1693 (Fed. Cir. 1998) (in banc); *Lueders*, 111 F.3d at 1571-72. "A finding is clearly erroneous when, although there is evidence to support [\*\*7] it, the reviewing court on the entire evidence is left with the definite and firm conviction that a mistake has been committed." *In re Graves*, 69 F.3d 1147, 1151, 36 U.S.P.Q.2D (BNA) 1697, 1700 (Fed. Cir. 1995) (quoting *United States v. United States Gypsum Co.*, 333 U.S. 364, 395, 92 L. Ed. 746, 68 S. Ct. 525 (1948)).

The secondary considerations are also essential components of the obviousness determination. See *In re Emerit*, 124 F.3d 1458, 1462, 44 U.S.P.Q.2D (BNA) 1149, 1153 (Fed. Cir. 1997) ("Without Emerit providing rebuttal evidence, this *prima facie* case of obviousness must stand."). This objective evidence of nonobviousness includes copying, long felt but unsolved need, failure of others, see *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 15 L. Ed. 2d 545, 86 S. Ct. 684 (1966), commercial success, see *In re Huang*, 100 F.3d 135, 139-40, 40 U.S.P.Q.2D (BNA) 1685, 1689-90 (Fed. Cir. 1996), unexpected results created by the claimed invention, unexpected properties of the claimed invention, see *In re Mayne*, 104 F.3d 1339, 1342, 41 U.S.P.Q.2D (BNA) 1451, 1454 (Fed. Cir. 1997); *In re Woodruff*, 919 F.2d 1575, 1578, 16 U.S.P.Q.2D (BNA) 1934, 1936-37 (Fed. Cir. 1990), licenses showing industry respect for [\*\*8] the invention, see *Arkie Lures, Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 957, 43 U.S.P.Q.2D (BNA) 1294, 1297 (Fed. Cir. 1997); *Pentec, Inc. v. Graphic Controls Corp.*, 776 F.2d 309, 316, 227 U.S.P.Q. (BNA) 766, 771 (Fed. Cir. 1985), and skepticism of skilled artisans before the invention, see *In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 U.S.P.Q.2D (BNA) 1529, 1532 (Fed. Cir. 1988). The Board must consider all of the applicant's evidence. See *Oetiker*, 977 F.2d at 1445 ("An observation by the Board that the examiner made a *prima facie* case is not improper, as long as the ultimate determination of patentability is made on the entire record."); *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. (BNA) 785, 788 (Fed. Cir. 1984). The court reviews factual conclusions drawn from this evidence for clear error. Whether the evidence presented suffices to rebut the *prima facie* case is part of the ultimate conclusion of obviousness and is therefore a question of law.

When a rejection depends on a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references. See *In re Geiger*, 815 F.2d 686, 688, 2 U.S.P.Q.2D (BNA) 1276, 1278 (Fed. Cir. 1987). Although the [\*\*9] suggestion to combine references may flow from the nature of the problem, see *Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 U.S.P.Q.2D (BNA) 1626, 1630 (Fed. Cir. 1996), the suggestion more often comes from the teachings of the pertinent references, see *In re Sernaker*, 702 F.2d 989, 994, 217 U.S.P.Q. (BNA) 1, 5 (Fed. Cir. 1983), or from the ordinary knowledge of those skilled in the art that certain references are of

special importance [\*\*1356] in a particular field, see *Pro-Mold*, 75 F.3d at 1573 (citing *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 297 n.24, 227 U.S.P.Q. (BNA) 657, 667 n.24 (Fed. Cir. 1985)). Therefore, "when determining the patentability of a claimed invention which combines two known elements, the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination." See *In re Beattie*, 974 F.2d 1309, 1311-12, 24 U.S.P.Q.2D (BNA) 1040, 1042 (Fed. Cir. 1992) (quoting *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462, 221 U.S.P.Q. (BNA) 481, 488 (Fed. Cir. 1984)).

### III

The parties agree that the five references asserted by the examiner [\*\*10] are in the same field of endeavor as the invention. The parties also agree that the pertinent level of skill in the art - design of satellite communications systems - is high. On appeal, Rouffet asserts that the examiner and the Board erred by improperly combining references to render the claimed invention obvious.

#### *The Combination of King, Rosen, and Ruddy*

The Board first affirmed the rejection of Rouffet's claims over a combination of King, Rosen, and Ruddy. King discloses a system for launching a plurality of satellites into low Earth orbits from a single launch vehicle. Rosen teaches a geostationary satellite that uses a plurality of fan beams with their long axes oriented in an east-west direction to communicate with mobile and fixed terminals on the Earth.

The final, and most important, reference in this combination is Ruddy. Ruddy describes a television broadcast system that uses a series of satellites to retransmit signals sent from a ground station over a wide area. Rather than using a geostationary orbit, Ruddy teaches the use of a series of satellites in Molniya orbits. A satellite in a Molniya orbit always follows the same path through the sky when viewed from a fixed [\*\*11] point on the ground. Viewed from the Earth, the orbital path includes a narrow, elliptical apogee loop. In order to transmit to these moving satellites from a ground station, Ruddy uses a fan beam with a long axis aligned with the long axis of the orbit's apogee loop. This alignment places the entire apogee loop within the footprint of the

beam and eliminates the need for the ground station's antenna to track the satellite's motion around the apogee loop. Ruddy further teaches orbit parameters and spacing of multiple satellites to ensure that a satellite is always in the loop to receive and rebroadcast signals from the Earth station.

King and Rosen together teach the use of a network of satellites in low Earth orbit. Thus, Ruddy becomes the piece of the prior art mosaic that shows, in the reading of the Board, the use of "a plurality of fan beams that are elongate in the travel direction of the satellite." Ruddy, however, is different from the claimed invention in several respects. Specifically, the application claims the projection of multiple elliptical fan-shaped footprints from the satellite to the ground. See Claim 1, *supra*, see also Application at 6, lines 9-11 ("In [\*\*12] addition, in this system, the geometrical shape of the beams 12 is changed: instead of being circular they are now elongate ellipses."). The application's written description further teaches that the invention's fan-shaped satellite beams will minimize handovers. See *id.* at lines 11-16 ("This considerably increases call durations between handovers.").

In contrast, Ruddy teaches that a ground station may use a single fan-shaped beam to transmit to a satellite in a unique Molniya orbit. The ground station transmits a beam into which a series of satellites in Molniya orbits will successively enter. At least two differences are evident: the application teaches projection of multiple beams from a satellite to the Earth, while Ruddy teaches projection of a single beam from the Earth to satellites. Moreover to the extent Ruddy contains a teaching about handovers, its teachings focus on use of the unique Molniya orbit to ensure that a satellite always falls within the beam transmitted by the ground station.

These differences suggest some difficulty in showing a *prima facie* case of obviousness. The Board, however, specifically found that artisans of ordinary skill in this field of [\*\*13] art would know to shift the frame of reference from a ground station following a satellite to a satellite transmitting to the ground. According proper deference to the Board's finding [\*1357] of a lofty skill level for ordinary artisans in this field, this court discerns no clear error in the Board's conclusion that these differences would not preclude a finding of obviousness. While Ruddy does not expressly teach alignment of the fan beam with the apparent direction of the satellite's

motion, this court perceives no clear error in the Board's determination that Ruddy would suggest such an alignment to one of skill in this art. Therefore, the Board did not err in finding that the combination of King, Rosen, and Ruddy contains all of the elements claimed in Rouffet's application.

However, the Board reversibly erred in determining that one of skill in the art would have been motivated to combine these references in a manner that rendered the claimed invention obvious. Indeed, the Board did not identify any motivation to choose these references for combination. Ruddy does not specifically address handover minimization. To the extent that Ruddy at all addresses handovers due to satellite motion, [\*\*14] it addresses this subject through the selection of orbital parameters. Ruddy does not teach the choice of a particular shape and alignment of the beam projected by the satellite. Thus Ruddy addresses the handover problem with an orbit selection, not a beam shape. The Board provides no reasons that one of ordinary skill in this art, seeking to minimize handovers due to satellite motion, would combine Ruddy with Rosen and King in a manner that would render the claimed invention obvious.

Obviousness is determined from the vantage point of a hypothetical person having ordinary skill in the art to which the patent pertains. See 35 U.S.C. § 103(a). This legal construct is akin to the "reasonable person" used as a reference in negligence determinations. The legal construct also presumes that all prior art references in the field of the invention are available to this hypothetical skilled artisan. See *In re Carlson*, 983 F.2d 1032, 1038, 25 U.S.P.Q.2D (BNA) 1207, 1211 (Fed. Cir. 1993).

As this court has stated, "virtually all [inventions] are combinations of old elements." *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 698, 218 U.S.P.Q. (BNA) 865, 870 (Fed. Cir. 1983); see also [\*\*15] *Richdel, Inc. v. Sunspool Corp.*, 714 F.2d 1573, 1579-80, 219 U.S.P.Q. (BNA) 8, 12 (Fed. Cir. 1983) ("Most, if not all, inventions are combinations and mostly of old elements"). Therefore an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the

prior art to defeat the patentability of the claimed invention. Such an approach would be "an illogical and inappropriate process by which to determine patentability." *Sensonics, Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570, 38 U.S.P.Q.2D (BNA) 1551, 1554 (Fed. Cir. 1996).

To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the [\*16] inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.

This court has identified three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. In this case, the Board relied upon none of these. Rather, just as it relied on the high level of skill in the art to overcome the differences between the claimed invention and the selected elements in the references, it relied upon the high level of skill in the art to provide the necessary motivation. The Board did not, however, explain what specific understanding or technological principle within the knowledge of one of ordinary skill in the art would have suggested the combination. Instead, the Board merely invoked the high level of skill in the field of art. If such a rote invocation could suffice to supply a motivation to combine, the more sophisticated scientific fields would rarely, if ever, experience a patentable technical advance. Instead, in complex scientific fields, the Board could routinely identify [\*17] the prior art elements in an application, invoke the lofty level of skill, and rest its case for rejection. To counter this potential weakness in the obviousness [\*1358] construct, the suggestion to combine requirement stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Because the Board did not explain the specific understanding or principle within the knowledge of a skilled artisan that would motivate one with no knowledge of Rouffet's invention to make the combination, this court infers that the examiner selected these references with the assistance of hindsight. This

court forbids the use of hindsight in the selection of references that comprise the case of obviousness. See *In re Gorman*, 933 F.2d 982, 986, 18 U.S.P.Q.2D (BNA) 1885, 1888 (Fed. Cir. 1991). Lacking a motivation to combine references, the Board did not show a proper *prima facie* case of obviousness. This court reverses the rejection over the combination of King, Rosen, and Ruddy.

#### *The Combination of Freeburg and Levine*

Freeburg teaches a cellular radiotelephone system based on a constellation of low Earth orbit satellites that use conical beams to transmit from [\*18] the satellite to both fixed and mobile Earth stations. Levine teaches an Earth-based cellular radio system that uses fan beams broadcast from antenna towers. Levine's elliptical footprints are aligned with the road grid. To increase the capacity of traditional ground-based systems through frequency reuse techniques, Levine teaches the use of antennas that broadcast signals with smaller footprints than the prior art system. Thus, Levine actually increases the number of overlap regions between cells and, hence, the number of potential handovers. Figure 1 of the Levine patent illustrates its alignment of beam footprints:

[SEE FIGURE 1 IN ORIGINAL]

[\*1359] As a mobile unit (e.g., a driver using a car phone) moves though a succession of overlapping zones, Levine uses selection algorithms to determine which of the cells is aligned with the travel direction of the mobile unit. These algorithms then select this cell for use while continually monitoring intersecting cells in the event that the mobile unit changes direction.

Once again, this court notes significant differences between the teachings of the application and the Levine-Freeburg combination. The critical Levine reference again involves [\*19] a beam from an Earth station without any reference to the "travel direction of [a] satellite." Moreover, Levine actually multiplies the number of potential handovers and then uses software to sort out the necessary handovers from the unnecessary. However, the Board explains the reasons that one possessing the lofty skills characteristic of this field would know to account for the differences between the claimed invention and the prior art combination. This court discerns no clear error in that reliance on the considerable skills in this field.

This court does, however, discern reversible error in the Board's identification of a motivation to combine Levine and Freeburg. In determining that one of skill in the art would have had motivation to combine Levine and Freeburg, the Board noted that "the level of skill in the art is very high." As noted before, this observation alone cannot supply the required suggestion to combine these references. The Board posits that the high level of skill in the art overcomes the absence of any actual suggestion that one could select part of the teachings of Levine for combination with the satellite system disclosed by Freeburg.

As noted above, the [\*20] suggestion to combine requirement is a safeguard against the use of hindsight combinations to negate patentability. While the skill level is a component of the inquiry for a suggestion to combine, a lofty level of skill alone does not suffice to supply a motivation to combine. Otherwise a high level of ordinary skill in an art field would almost always preclude patentable inventions. As this court has often noted, invention itself is the process of combining prior art in a nonobvious manner. See, e.g., *Richdel*, 714 F.2d at 1579; *Environmental Designs*, 713 F.2d at 698. Therefore, even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination. Cf. *Gechter v. Davidson*, 116 F.3d 1454, 43 U.S.P.Q.2D (BNA) 1030 (Fed. Cir. 1997) (explaining that the Board's opinion must describe the basis for its decision). In other words, the Board must explain the

reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious.

The Board's naked invocation of skill in the art to supply a suggestion to combine [\*21] the references cited in this case is therefore clearly erroneous. Absent any proper motivation to combine part of Levine's teachings with Freeburg's satellite system, the rejection of Rouffet's claim over these references was improper and is reversed.

#### IV

The Board reversibly erred in determining that there was a motivation to combine either the teachings of King, Rosen, and Ruddy or of Freeburg and Levine in a manner that would render the claimed invention obvious. Because this predicate was missing in each case, the Board did not properly show that these references render the claimed invention obvious. Therefore this court reverses the Board's decision upholding the rejection of Rouffet's claims. In light of this disposition, Rouffet's pending motion to remand the case to the Board for further consideration is denied as moot.

#### COSTS

Each party shall bear its own costs.

REVERSED.

LEXSEE 740 F.2D 1569

IN RE YUJIRO YAMAMOTO, Appellant and DICTAPHONE CORP., Intervenor

No. 84-557

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

*740 F.2d 1569; 1984 U.S. App. LEXIS 15163; 222 U.S.P.Q. (BNA) 934*

August 7, 1984

**PRIOR HISTORY:** [\*\*1]Appealed from: U.S. Patent & Trademark Office Board of Appeals.

**COUNSEL:** Grover A. Frater, of Santa Fe, California, argued for Appellant.

Thomas E. Lynch, of Arlington, Virginia, argued for Appellee. With him on the brief were Joseph F. Nakamura, Solicitor and Jere W. Sears, Deputy Solicitor.

Gregor N. Neff, of New York, New York, argued for Intervenor. With him on the brief were William S. Frommer, or counsel and Melvin J. Scolnick, of Stamford, Connecticut, of Counsel.

**JUDGES:** Davis, Baldwin, and Miller, Circuit Judges. Miller, Circuit Judge, concurring in part and dissenting in part.

**OPINION BY: BALDWIN**

**OPINION**

[\*1570] BALDWIN, Circuit Judge.

This appeal is from a decision of the United States Patent and Trademark Office (PTO) Board of Appeals (board) in a reexamination proceeding involving U.S. Patent No. 3,747,228 (Yamamoto) issued to appellant, Yamamoto. The board affirmed rejection of claims 1-3, 7, and 8 as unpatentable under 35 U.S.C. § 103 over U.S. Patent No. 3,300,586 (Shepard) and of claim 4 over Shepard in view of U.S. Patent No. 3,550,289 (Orita). We affirm.

*Procedural History*

Appellant filed suit for infringement of the Yamamoto patent in the United [\*\*2] States District Court for the Central District of California against Dictaphone Corporation (Dictaphone). Dictaphone requested reexamination of the patent in suit and is an intervenor in this appeal. The District Court action was stayed pending the outcome of the reexamination proceeding.

*The Invention*

The Yamamoto patent describes and claims an interview machine. The machine asks a question, records the interviewee's answer, then asks another question. This alternating question and answer sequence is repeated until the interview is completed. The machine detects the continuance and the end of each question. It also detects the continuance and the end of each answer. Using this detected information, the machine determines the timing of questions and the periods allowed for response. The machine may be programmed to repeat a question if no response is given, to go on to the next question, or to terminate the interview. Claim 1 of the patent recites appellant's invention as follows:

1. An interview machine comprising:

a question storage memory adapted for storing a series of questions to be asked of an interviewee, and having associated means for retrieving each [\*\*3] question from the memory and communicating it in audible form to the interviewee;

an answer storage memory adapted for storing a series of answers given by the interviewee;

740 F.2d 1569, \*1570; 1984 U.S. App. LEXIS 15163, \*\*3;  
222 U.S.P.Q. (BNA) 934

manually operable means for causing the first question of the series to be communicated to the interviewee; and

timing and control means responsive if the question is not answered within a predetermined period of time for causing the next question of the series to be communicated to the interviewee, and responsive if an answer is initiated within said predetermined period of time for [\*1571] delaying the retrieval and communication of the next question until the answer has been completed;

whereby the interviewee upon initiating his answer within said predetermined period of time may give as long an answer as he desires, and upon completion of his answer the machine automatically communicates the next question of the series to him.

#### *The Prior Art*

The Shepard patent describes a telephone answering machine. In addition to simply answering the telephone, it asks the caller questions and records answers to those questions. The caller may give an answer for as long as he likes. The [\*4] next question will be posed when the previous answer is completed. If a question is not answered within a certain time, the machine automatically asks the next question. The machine described in Shepard is also capable of distinguishing between "YES" and "NO" answers and selecting the next question according to the answer given. In addition, the machine may control the operation of several different tape recorders and telephones simultaneously.

The Orita patent describes a language teaching machine which delivers a series of questions or instructions to headphones worn by students. Students' answers are spoken into a microphone and are recorded one after another in a tape recorder. The student may answer for as long as he or she wants. When an answer is completed, the next question is automatically sent to the headphones.

#### OPINION

The first issue presented by this appeal is whether the

board adopted the correct standard of claim interpretation in reexamination proceedings. The board said that claims subject to reexamination will "be given their broadest reasonable interpretation consistent with the specification, and limitations appearing in the specification are not to [\*5] be read into the claims." In adopting this standard for reexamination proceedings, the board followed *In re Reuter*, 651 F.2d 751, 210 U.S.P.Q. (BNA) 249 (CCPA 1981), where the United States Court of Customs and Patent Appeals approved use of the broadest reasonable interpretation standard in reissue proceedings.

Appellant contends that the adoption of this standard for interpreting claims subject to reexamination was error. Appellant urges us to require the PTO to apply a rule of claim construction adopted by Federal District Courts when the validity of an issued patent is in question. Appellant relies on *Photo Electronics Corp. v. England*, 581 F.2d 772, 199 U.S.P.Q. (BNA) 710 (9th Cir. 1978), where the United States Court of Appeals for the Ninth Circuit described its approach to claim construction in an infringement action in the following manner:

The starting point is the rule that patent claims should be construed liberally to uphold the patent's validity rather than to destroy the inventor's right to protect the substance of his invention . . . .

*Id.* at 776, 199 U.S.P.Q. at 714 (citations omitted). \* We affirm the board's decision to give claims [\*6] their broadest reasonable interpretation, consistent with the specification, in reexamination proceedings.

\* In a district court context, we too have said that claims should be construed, if possible, to sustain their validity. *ACS Hosp. Systems, Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 U.S.P.Q. (BNA) 929, 932 (Fed. Cir. 1984); *Carmen Indus., Inc. v. Wahl*, 724 F.2d 932, 937 n.5, 220 U.S.P.Q. (BNA) 481, 485 n.5 (Fed. Cir. 1983).

The PTO broadly interprets claims during examination of a patent application since the applicant may "amend his claims to obtain protection

740 F.2d 1569, \*1571; 1984 U.S. App. LEXIS 15163, \*\*6;  
222 U.S.P.Q. (BNA) 934

commensurate with his actual contribution to the art." *In re Prater*, 56 C.C.P.A. 1381, 415 F.2d 1393, 1404-05, 162 U.S.P.Q. (BNA) 541, 550 (1969). This approach serves the public interest by reducing the possibility that claims, finally allowed, will be given broader scope than is justified. Applicants' interests are not impaired since they are not foreclosed from obtaining appropriate coverage for their invention with express [\*\*7] claim language. *Id.* [\*1572] at 1405 n.31, 162 U.S.P.Q. at 550 n.31.

An applicant's ability to amend his claims to avoid cited prior art distinguishes proceedings before the PTO from proceedings in federal district courts on issued patents. When an application is pending in the PTO, the applicant has the ability to correct errors in claim language and adjust the scope of claim protection as needed. This opportunity is not available in an infringement action in district court. District courts may find it necessary to interpret claims to protect only that which constitutes patentable subject matter to do justice between the parties. *Id.* at 1404, 162 U.S.P.Q. at 550.

The same policies warranting the PTO's approach to claim interpretation when an original application is involved have been held applicable to reissue proceedings because the reissue provision, 35 U.S.C. § 251, permits amendment of the claims to avoid prior art. *In re Reuter*, 651 F.2d at 756, 210 U.S.P.Q. at 253-54. The reexamination law, set forth below, gives patent owners the same right:

In any reexamination proceeding under this chapter, the patent owner will be permitted to propose [\*\*8] any amendment to his patent and a new claim or claims thereto, in order to distinguish the invention as claimed from the prior art cited under the provisions of section 301 of this title, or in response to a decision adverse to the patentability of a claim of a patent. No proposed amended or new claim enlarging the scope of a claim of the patent will be permitted in a reexamination proceeding under this chapter.

35 U.S.C. § 305 (1982).

Appellant therefore had an opportunity during reexamination in the PTO to amend his claims to correspond with his contribution to the art. The reasons underlying the PTO's interpretation of the claims in reissue proceedings therefore justify using the same approach in reexamination proceedings.

On the merits of claim 1, the board correctly concluded that the Shepard patent exactly corresponds to appellant's claim except for the following feature: "an answer storage memory adapted for storing a series of answers given by the interviewee." This is also, in our view, the only difference between Shepard and claims 2, 3, 7, and 8.

Appellant argues this language of claim 1 requires all of the answers to be stored one after another and [\*\*9] that they be stored in that form indefinitely. Shepard discloses recording each answer on a magnetic tape. It is not clear from Shepard whether the answer is permanently stored or whether it is erased after use. The board found that Shepard teaches a means for storing the answers for later use if desired. Specifically, according to Shepard, a caller may be invited to leave a name and telephone number to permit completion of any desired business. From this the board inferred, appropriately in our view, that one of ordinary skill in the art reading Shepard would have understood the advantages of recording and storing answers and how to do it. The board concluded that storing the answers in a series, one answer after another, would have been within the ability of a person of ordinary skill in the art. Claims 2 and 7 are the only other independent claims in the application. Appellant has not identified any other differences between claims 2, 3, 7, or 8, and the Shepard patent that would require overturning the board's decision.

The board rejected claim 4 over the combined teachings of Shepard and Orita. At issue here is the means used to stop the storage tape drive when a question [\*\*10] is completed. Claim 4, which is dependent on claim 2, requires:

a first timer coupled to the output of said first signal presence detector, . . . the outputs of said first and second timers being coupled to said drive means for respectively stopping or starting the question storage tape . . .

740 F.2d 1569, \*1572; 1984 U.S. App. LEXIS 15163, \*\*10;  
222 U.S.P.Q. (BNA) 934

Shepard does not use a timer to stop a question storage tape drive after a question is transmitted. Orita, however, does teach this feature. Orita teaches using a timer in the form of an integrating circuit in conjunction with a Schmidt trigger to [\*1573] automatically stop the instructional tape recorder when one of the instructional programs ends. An oral response (or answer) to the instruction program is then recorded on the practice tape recorder. Another timer detects the end of the answer and causes the practice tape recorder to turn off and the instructional tape recorder to turn on and deliver the next instruction. We agree with the board that this teaching provides evidence that Yamamoto's inclusion of a timer to shut off the question storage tape after a question has been transmitted would have been obvious to one of ordinary skill in the art.

Although [\*11] appellant argues that adding Orita's timer to the Shepard device would make the device inoperable, we have said before that a claim may have been obvious in view of a combination of references even if the features of one reference cannot be substituted physically into the structure of the other references. *In re Sneed*, 710 F.2d 1544, 1550, 218 U.S.P.Q. (BNA) 385, 389 (Fed. Cir. 1983); *Orthopedic Equipment Co. v. United States*, 702 F.2d 1005, 1013, 217 U.S.P.Q. (BNA) 193, 200 (Fed. Cir. 1983).

Appellant also argues the patentability of claims 9-11. However, we agree with the solicitor's contention that claims 9-11 have been abandoned. The examiner originally indicated claims 9-11 were allowable. After considering appellant's appeal on the rejected claims, the board remanded the application to the examiner recommending that claims 9-11 be rejected under 35 U.S.C. § 103. The board further required the case to be returned to the board, after proceedings were completed on remand, so the board could either adopt its earlier decision as final or enter a new decision. 37 C.F.R. § 1.196(d) (1983). The board set a one month period for appellant to make an appropriate amendment [\*12] or showing of facts, or both, to overcome the rejection.

Appellant did not respond within the one-month period. The examiner restated the rejection and gave appellant an additional month to respond. Appellant did not respond to the rejection nor did he appeal to the board from the rejection. The case was then returned to the board for final action. As the regulation permits, the board, without comment and without argument, affirmed rejection of all claims. Since appellant neither responded to the rejection of claims 9-11 before the primary examiner nor appealed the rejection to the board, claims 9-11 are treated as having been abandoned. See 37 C.F.R. § 1.196(d); *id.* § 1.550(d).

For the foregoing reasons, the board's decision is *affirmed*.

AFFIRMED.

CONCUR BY: MILLER (In Part)

CONCUR

MILLER (In Part)

DISSENT

MILLER, Circuit Judge, concurring in part and dissenting in part.

I dissent with respect to claim 4, the obviousness of which is not supported by Shepard in view of Orita. Indeed, stopping Shepard's question tape drive in accordance with Orita would stop the answer recording tape, and, without a recorded answer, the next question would not be asked. The "bodily [\*13] incorporation" point made by the majority opinion is not responsive to appellant's position that the operation of the devices of Orita and Shepard is so different that one of ordinary skill in the art would not view this as a natural and logical combination. *In re Walker*, 54 C.C.P.A. 1235, 374 F.2d 908, 913, 153 U.S.P.Q. (BNA) 180, 185 (1967).

LEXSEE 127 S. CT. 1727

KSR INTERNATIONAL CO., PETITIONER v. TELEFLEX INC. ET AL.

No. 04-1350

SUPREME COURT OF THE UNITED STATES

127 S. Ct. 1727; 167 L. Ed. 2d 705; 2007 U.S. LEXIS 4745; 75 U.S.L.W. 4289; 82  
U.S.P.Q.2D (BNA) 1385; 20 Fla. L. Weekly Fed. S 248

November 28, 2006, Argued  
April 30, 2007, Decided

NOTICE:

[\*\*\*1] The LEXIS pagination of this document is subject to change pending release of the final published version.

**SUBSEQUENT HISTORY:** On remand at *Teleflex, Inc. v. KSR Int'l Co.*, 2007 U.S. App. LEXIS 16051 (Fed. Cir., June 20, 2007)

**PRIOR HISTORY:** ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT.

*Teleflex, Inc. v. KSR Int'l Co.*, 119 Fed. Appx. 282, 2005 U.S. App. LEXIS 176 (Fed. Cir., 2005)

**DISPOSITION:** Reversed and remanded.

SYLLABUS

To control a conventional automobile's speed, the driver depresses or releases the gas pedal, which interacts with the throttle via a cable or other mechanical link. Because the pedal's position in the footwell normally cannot be adjusted, a driver wishing to be closer or farther from it must either reposition himself in the seat or move the seat, both of which can be imperfect solutions for smaller drivers in cars with deep footwells. This prompted inventors to design and patent pedals that could be adjusted to change their locations. The Asano patent reveals a support structure whereby, when the pedal location is [\*\*\*2] adjusted, one of the pedal's pivot points stays fixed. Asano is also designed so that the force necessary to depress the pedal is the same regardless of location adjustments. The Redding patent

reveals a different, sliding mechanism where both the pedal and the pivot point are adjusted.

In newer cars, computer-controlled throttles do not operate through force transferred from the pedal by a mechanical link, but open and close valves in response to electronic signals. For the computer to know what is happening with the pedal, an electronic sensor must translate the mechanical operation into digital data. Inventors had obtained a number of patents for such sensors. The so-called '936 patent taught that it was preferable to detect the pedal's position in the pedal mechanism, not in the engine, so the patent disclosed a pedal with an electronic sensor on a pivot point in the pedal assembly. The Smith patent taught that to prevent the wires connecting the sensor to the computer from chafing and wearing out, the sensor should be put on a fixed part of the pedal assembly rather than in or on the pedal's footpad. Inventors had also patented self-contained modular sensors, which can be [\*\*\*3] taken off the shelf and attached to any mechanical pedal to allow it to function with a computer-controlled throttle. The '065 patent disclosed one such sensor. Chevrolet also manufactured trucks using modular sensors attached to the pedal support bracket, adjacent to the pedal and engaged with the pivot shaft about which the pedal rotates. Other patents disclose electronic sensors attached to adjustable pedal assemblies. For example, the Rixon patent locates the sensor in the pedal footpad, but is known for wire chafing.

After petitioner KSR developed an adjustable pedal system for cars with cable-actuated throttles and obtained its '976 patent for the design, General Motors Corporation (GMC) chose KSR to supply adjustable pedal systems for trucks using computer-controlled

127 S. Ct. 1727, \*; 167 L. Ed. 2d 705, \*\*;  
2007 U.S. LEXIS 4745, \*\*\*; 75 U.S.L.W. 4289

throttles. To make the '976 pedal compatible with the trucks, KSR added a modular sensor to its design. Respondents (Teleflex) hold the exclusive license for the Engelgau patent, claim 4 of which discloses a position-adjustable pedal assembly with an electronic pedal position sensor attached a fixed pivot point. Despite having denied a similar, broader claim, the U.S. Patent and Trademark Office (PTO) had allowed [\*\*\*4] claim 4 because it included the limitation of a fixed pivot position, which distinguished the design from Redding's. Asano was neither included among the Engelgau patent's prior art references nor mentioned in the patent's prosecution, and the PTO did not have before it an adjustable pedal with a fixed pivot point. After learning of KSR's design for GMC, Teleflex sued for infringement, asserting that KSR's pedal system infringed the Engelgau patent's claim 4. KSR countered that claim 4 was invalid under § 103 of the Patent Act, which forbids issuance of a patent when "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art."

*Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18, 86 S. Ct. 684, 15 L. Ed. 2d 545, set out an objective analysis for applying § 103: "The scope and content of the prior art are . . . determined; differences between the prior art and the claims at issue are . . . ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness [\*\*\*5] of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented." While the sequence of these questions might be reordered in any particular case, the factors define the controlling inquiry. However, seeking to resolve the obviousness question with more uniformity and consistency, the Federal Circuit has employed a "teaching, suggestion, or motivation" (TSM) test, under which a patent claim is only proved obvious if the prior art, the problem's nature, or the knowledge of a person having ordinary skill in the art reveals some motivation or suggestion to combine the prior art teachings.

The District Court granted KSR summary judgment. After reviewing pedal design history, the Engelgau

patent's scope, and the relevant prior art, the court considered claim 4's validity, applying *Graham's* framework to determine whether under summary-judgment standards KSR had demonstrated that claim 4 was obvious. The court found "little difference" between the prior art's teachings and claim 4: [\*\*\*6] Asano taught everything contained in the claim except using a sensor to detect the pedal's position and transmit it to a computer controlling the throttle. That additional aspect was revealed in, e.g., the '068 patent and Chevrolet's sensors. The court then held that KSR satisfied the TSM test, reasoning (1) the state of the industry would lead inevitably to combinations of electronic sensors and adjustable pedals, (2) Rixon provided the basis for these developments, and (3) Smith taught a solution to Rixon's chafing problems by positioning the sensor on the pedal's fixed structure, which could lead to the combination of a pedal like Asano with a pedal position sensor.

Reversing, the Federal Circuit ruled the District Court had not applied the TSM test strictly enough, having failed to make findings as to the specific understanding or principle within a skilled artisan's knowledge that would have motivated one with no knowledge of the invention to attach an electronic control to the Asano assembly's support bracket. The Court of Appeals held that the District Court's recourse to the nature of the problem to be solved was insufficient because, unless the prior art references [\*\*\*7] addressed the precise problem that the patentee was trying to solve, the problem would not motivate an inventor to look at those references. The appeals court found that the Asano pedal was designed to ensure that the force required to depress the pedal is the same no matter how the pedal is adjusted, whereas Engelgau sought to provide a simpler, smaller, cheaper adjustable electronic pedal. The Rixon pedal, said the court, suffered from chafing but was not designed to solve that problem and taught nothing helpful to Engelgau's purpose. Smith, in turn, did not relate to adjustable pedals and did not necessarily go to the issue of motivation to attach the electronic control on the pedal assembly's support bracket. So interpreted, the court held, the patents would not have led a person of ordinary skill to put a sensor on an Asano-like pedal. That it might have been obvious to try that combination was likewise irrelevant. Finally, the court held that genuine issues of material fact precluded summary judgment.

*Held:* The Federal Circuit addressed the obviousness

127 S. Ct. 1727, \*; 167 L. Ed. 2d 705, \*\*;  
2007 U.S. LEXIS 4745, \*\*\*7; 75 U.S.L.W. 4289

question in a narrow, rigid manner that is inconsistent with § 103 and this Court's precedents. KSR provided convincing [\*\*\*8] evidence that mounting an available sensor on a fixed pivot point of the Asano pedal was a design step well within the grasp of a person of ordinary skill in the relevant art and that the benefit of doing so would be obvious. Its arguments, and the record, demonstrate that the Engelgau patent's claim 4 is obvious. Pp. 11-24.

1. *Graham* provided an expansive and flexible approach to the obviousness question that is inconsistent with the way the Federal Circuit applied its TSM test here. Neither § 103's enactment nor *Graham's* analysis disturbed the Court's earlier instructions concerning the need for caution in granting a patent based on the combination of elements found in the prior art. See *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 152, 71 S. Ct. 127, 95 L. Ed. 162, 1951 Dec. Comm'r Pat. 572. Such a combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. See, e.g., *United States v. Adams*, 383 U.S. 39, 50-52, 86 S. Ct. 708, 15 L. Ed. 2d 572, 174 Cl. Cl. 1293. When a work is available in one field, design incentives and other market forces can prompt variations of it, either in the same field or in another. If a person [\*\*\*9] of ordinary skill in the art can implement a predictable variation, and would see the benefit of doing so, § 103 likely bars its patentability. Moreover, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person's skill. A court must ask whether the improvement is more than the predictable use of prior-art elements according to their established functions. Following these principles may be difficult if the claimed subject matter involves more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement. To determine whether there was an apparent reason to combine the known elements in the way a patent claims, it will often be necessary to look to interrelated teachings of multiple patents; to the effects of demands known to the design community or present in the marketplace; and to the background knowledge possessed by a person having ordinary skill in the art. To facilitate review, this analysis should [\*\*\*10] be made explicit. But it need not seek out precise teachings

directed to the challenged claim's specific subject matter, for a court can consider the inferences and creative steps a person of ordinary skill in the art would employ. Pp. 11-14.

(b) The TSM test captures a helpful insight: A patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art. Although common sense directs caution as to a patent application claiming as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the art to combine the elements as the new invention does. Inventions usually rely upon building blocks long since uncovered, and claimed discoveries almost necessarily will be combinations of what, in some sense, is already known. Helpful insights, however, need not become rigid and mandatory formulas. If it is so applied, the TSM test is incompatible with this Court's precedents. The diversity of inventive pursuits and of modern technology counsels against confining the obviousness analysis [\*\*\*11] by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasizing the importance of published articles and the explicit content of issued patents. In many fields there may be little discussion of obvious techniques or combinations, and market demand, rather than scientific literature, may often drive design trends. Granting patent protection to advances that would occur in the ordinary course without real innovation retards progress and may, for patents combining previously known elements, deprive prior inventions of their value or utility. Since the TSM test was devised, the Federal Circuit doubtless has applied it in accord with these principles in many cases. There is no necessary inconsistency between the test and the *Graham* analysis. But a court errs where, as here, it transforms general principle into a rigid rule limiting the obviousness inquiry. Pp. 14-15.

(c) The flaws in the Federal Circuit's analysis relate mostly to its narrow conception of the obviousness inquiry consequent in its application of the TSM test. The Circuit first erred in holding that courts and patent examiners should look only to the problem the patentee was trying [\*\*\*12] to solve. Under the correct analysis, any need or problem known in the field and addressed by the patent can provide a reason for combining the elements in the manner claimed. Second, the appeals

127 S. Ct. 1727, \*; 167 L. Ed. 2d 705, \*\*;  
2007 U.S. LEXIS 4745, \*\*\*12; 75 U.S.L.W. 4289

court erred in assuming that a person of ordinary skill in the art attempting to solve a problem will be led only to those prior art elements designed to solve the same problem. The court wrongly concluded that because Asano's primary purpose was solving the constant ratio problem, an inventor considering how to put a sensor on an adjustable pedal would have no reason to consider putting it on the Asano pedal. It is common sense that familiar items may have obvious uses beyond their primary purposes, and a person of ordinary skill often will be able to fit the teachings of multiple patents together like pieces of a puzzle. Regardless of Asano's primary purpose, it provided an obvious example of an adjustable pedal with a fixed pivot point, and the prior art was replete with patents indicating that such a point was an ideal mount for a sensor. Third, the court erred in concluding that a patent claim cannot be proved obvious merely by showing that the combination of elements was obvious to try. [\*\*\*13] When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. Finally, the court drew the wrong conclusion from the risk of courts and patent examiners falling prey to hindsight bias. Rigid preventative rules that deny recourse to common sense are neither necessary under, nor consistent with, this Court's case law. Pp. 15-18.

2. Application of the foregoing standards demonstrates that claim 4 is obvious. Pp. 18-23.

(a) The Court rejects Teleflex's argument that the Asano pivot mechanism's design prevents its combination with a sensor in the manner claim 4 describes. This argument was not raised before the District Court, and it is unclear whether it was raised before the Federal Circuit. Given the significance of the District Court's finding that combining Asano with a pivot-mounted pedal position sensor fell within claim 4's scope, it is apparent that Teleflex would [\*\*\*14] have made clearer challenges if it intended to preserve this claim. Its failure to clearly raise the argument, and the appeals court's silence on the issue, lead this Court to accept the District Court's conclusion. Pp. 18-20.

(b) The District Court correctly concluded that when Engelgau designed the claim 4 subject matter, it was

obvious to a person of ordinary skill in the art to combine Asano with a pivot-mounted pedal position sensor. There was a marketplace creating a strong incentive to convert mechanical pedals to electronic pedals, and the prior art taught a number of methods for doing so. The Federal Circuit considered the issue too narrowly by, in effect, asking whether a pedal designer writing on a blank slate would have chosen both Asano and a modular sensor similar to the ones used in the Chevrolet trucks and disclosed in the '068 patent. The proper question was whether a pedal designer of ordinary skill in the art, facing the wide range of needs created by developments in the field, would have seen an obvious benefit to upgrading Asano with a sensor. For such a designer starting with Asano, the question was where to attach the sensor. The '936 patent taught [\*\*\*15] the utility of putting the sensor on the pedal device. Smith, in turn, explained not to put the sensor on the pedal footpad, but instead on the structure. And from Rixon's known wire-chafing problems, and Smith's teaching that the pedal assemblies must not precipitate any motion in the connecting wires, the designer would know to place the sensor on a nonmoving part of the pedal structure. The most obvious such point is a pivot point. The designer, accordingly, would follow Smith in mounting the sensor there. Just as it was possible to begin with the objective to upgrade Asano to work with a computer-controlled throttle, so too was it possible to take an adjustable electronic pedal like Rixon and seek an improvement that would avoid the wire-chafing problem. Teleflex has not shown anything in the prior art that taught away from the use of Asano, nor any secondary factors to dislodge the determination that claim 4 is obvious. Pp. 20-23.

3. The Court disagrees with the Federal Circuit's holding that genuine issues of material fact precluded summary judgment. The ultimate judgment of obviousness is a legal determination. *Graham*, 383 U.S., at 17, 86 S. Ct. 684, 15 L. Ed. 2d 545. Where, as here, the [\*\*\*16] prior art's content, the patent claim's scope, and the level of ordinary skill in the art are not in material dispute and the claim's obviousness is apparent, summary judgment is appropriate. P. 23.

*119 Fed. Appx. 282, reversed and remanded.*

**COUNSEL:** James W. Dabney argued the cause for petitioner.

Thomas G. Hungargued the cause for the United

127 S. Ct. 1727, \*; 167 L. Ed. 2d 705, \*\*;  
2007 U.S. LEXIS 4745, \*\*\*16; 75 U.S.L.W. 4289

States, as amicus curiae, by special leave of court.

**Thomas C. Goldstein**

**JUDGES:** KENNEDY, J., delivered the opinion for a unanimous Court.

**OPINION BY: KENNEDY**

**OPINION**

[\*\*714] [\*1734] JUSTICE KENNEDY delivered the opinion of the Court.

Teleflex Incorporated and its subsidiary Technology Holding Company -- both referred to here as Teleflex -- sued KSR International Company for patent infringement. The patent at issue, *United States Patent No. 6,237,565 B1*, is entitled "Adjustable Pedal Assembly With Electronic Throttle Control." Supplemental App. 1. The patentee is Steven J. Engelgau, and the patent is referred to as "the Engelgau patent." Teleflex holds the exclusive license to the patent.

Claim 4 of the Engelgau patent describes a mechanism for combining an electronic sensor with an adjustable automobile pedal so the pedal's position can be transmitted to a computer that controls the throttle in the vehicle's engine. When Teleflex accused KSR of infringing the Engelgau patent by adding an electronic sensor to one of KSR's previously [\*\*17] designed pedals, KSR countered that claim 4 was invalid under the Patent Act, 35 U.S.C. § 103, because its subject matter was obvious.

*Section 103* forbids issuance of a patent when "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having [\*\*715] ordinary skill in the art to which said subject matter pertains."

In *Graham v. John Deere Co. of Kansas City*, 353 U.S. 1, 86 S. Ct. 684, 15 L. Ed. 2d 545 (1966), the Court set out a framework for applying the statutory language of § 103, language itself based on the logic of the earlier decision in *Hotchkiss v. Greenwood*, 52 U.S. 248, 11 How. 248, 13 L. Ed. 683 (1851), and its progeny. See 383 U.S., at 15-17, 86 S. Ct. 684, 15 L. Ed. 2d 545. The analysis is objective:

"Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations [\*\*18] as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented." *Id.*, at 17-18, 86 S. Ct. 684, 15 L. Ed. 2d 545.

While the sequence of these questions might be reordered in any particular case, the factors continue to define the inquiry that controls. If a court, or patent examiner, conducts this analysis and concludes the claimed subject matter was obvious, the claim is invalid under § 103.

Seeking to resolve the question of obviousness with more uniformity and consistency, the Court of Appeals for the Federal Circuit has employed an approach referred to by the parties as the "teaching, suggestion, or motivation" test (TSM test), under which a patent claim is only proved obvious if "some motivation or suggestion to combine the prior art teachings" can be found in the prior art, the nature of the problem, or the knowledge of a person having ordinary skill in the art. See, e.g., *Ab-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1323-1324 (CA Fed. 1999). KSR challenges that [\*1735] test, or at least its application in this case. See 119 Fed. Appx. 282, 286-290 (CA Fed. 2005). [\*\*19] Because the Court of Appeals addressed the question of obviousness in a manner contrary to § 103 and our precedents, we granted certiorari, 547 U.S. , 126 S. Ct. 2965, 165 L. Ed. 2d 949 (2006). We now reverse.

I

A

In car engines without computer-controlled throttles, the accelerator pedal interacts with the throttle via cable or other mechanical link. The pedal arm acts as a lever rotating around a pivot point. In a cable-actuated throttle control the rotation caused by pushing down the pedal pulls a cable, which in turn pulls open valves in the carburetor or fuel injection unit. The wider the valves

127 S. Ct. 1727, \*1735; 167 L. Ed. 2d 705, \*\*715;  
2007 U.S. LEXIS 4745, \*\*\*19; 75 U.S.L.W. 4289

open, the more fuel and air are released, causing combustion to increase and the car to accelerate. When the driver takes his foot off the pedal, the opposite occurs as the cable is released and the valves slide closed.

In the 1990's it became more common to install computers in cars to control engine operation. Computer-controlled throttles open and close valves in response to electronic signals, not through force transferred from the pedal by a mechanical link. Constant, delicate adjustments of air and fuel mixture are possible. The computer's rapid processing of factors beyond the pedal's position improves [\*\*\*20] [\*\*716] fuel efficiency and engine performance.

For a computer-controlled throttle to respond to a driver's operation of the car, the computer must know what is happening with the pedal. A cable or mechanical link does not suffice for this purpose; at some point, an electronic sensor is necessary to translate the mechanical operation into digital data the computer can understand.

Before discussing sensors further we turn to the mechanical design of the pedal itself. In the traditional design a pedal can be pushed down or released but cannot have its position in the footwell adjusted by sliding the pedal forward or back. As a result, a driver who wishes to be closer or farther from the pedal must either reposition himself in the driver's seat or move the seat in some way. In cars with deep footwells these are imperfect solutions for drivers of smaller stature. To solve the problem, inventors, beginning in the 1970's, designed pedals that could be adjusted to change their location in the footwell. Important for this case are two adjustable pedals disclosed in *U.S. Patent Nos. 5,010,782* (filed July 28, 1989) (Asano) and *5,460,061* (filed Sept. 17, 1993) (Redding). The Asano patent reveals a [\*\*\*21] support structure that houses the pedal so that even when the pedal location is adjusted relative to the driver, one of the pedal's pivot points stays fixed. The pedal is also designed so that the force necessary to push the pedal down is the same regardless of adjustments to its location. The Redding patent reveals a different, sliding mechanism where both the pedal and the pivot point are adjusted.

We return to sensors. Well before Engelgau applied for his challenged patent, some inventors had obtained patents involving electronic pedal sensors for computer-controlled throttles. These inventions, such as the device disclosed in *U.S. Patent No. 5,241,936* (filed

Sept. 9, 1991) ('936), taught that it was preferable to detect the pedal's position in the pedal assembly, not in the engine. The '936 patent disclosed a pedal with an electronic sensor on a pivot point in the pedal assembly. *U.S. Patent No. 5,063,811* (filed July 9, 1990) (Smith) taught that to prevent the [\*1736] wires connecting the sensor to the computer from chafing and wearing out, and to avoid grime and damage from the driver's foot, the sensor should be put on a fixed part of the pedal assembly rather than in or on the pedal's [\*\*\*22] footpad.

In addition to patents for pedals with integrated sensors inventors obtained patents for self-contained modular sensors. A modular sensor is designed independently of a given pedal so that it can be taken off the shelf and attached to mechanical pedals of various sorts, enabling the pedals to be used in automobiles with computer-controlled throttles. One such sensor was disclosed in *U.S. Patent No. 5,385,065* (filed Dec. 18, 1992) (068). In 1994, Chevrolet manufactured a line of trucks using modular sensors "attached to the pedal support bracket, adjacent to the pedal and engaged with the pivot shaft about which the pedal rotates in operation." *298 F. Supp. 2d 581, 589 (ED Mich. 2003)*.

The prior art contained patents involving the placement of sensors on adjustable pedals as well. For example, *U.S. Patent No. 5,819,593* (filed Aug. 17, 1995) (Rixon) discloses an adjustable pedal assembly with an [\*\*717] electronic sensor for detecting the pedal's position. In the Rixon pedal the sensor is located in the pedal footpad. The Rixon pedal was known to suffer from wire chafing when the pedal was depressed and released.

This short account of pedal and sensor technology leads [\*\*\*23] to the instant case.

## B

KSR, a Canadian company, manufactures and supplies auto parts, including pedal systems. Ford Motor Company hired KSR in 1998 to supply an adjustable pedal system for various lines of automobiles with cable-actuated throttle controls. KSR developed an adjustable mechanical pedal for Ford and obtained *U.S. Patent No. 6,151,976* (filed July 16, 1999) ('976) for the design. In 2000, KSR was chosen by General Motors Corporation (GMC or GM) to supply adjustable pedal systems for Chevrolet and GMC light trucks that used engines with computer-controlled throttles. To make the '976 pedal compatible with the trucks, KSR merely took

127 S. Ct. 1727, \*1736; 167 L. Ed. 2d 705, \*\*717; 2007 U.S. LEXIS 4745, \*\*\*23; 75 U.S.L.W. 4289

that design and added a modular sensor.

Teleflex is a rival to KSR in the design and manufacture of adjustable pedals. As noted, it is the exclusive licensee of the Engelgau patent. Engelgau filed the patent application on August 22, 2000 as a continuation of a previous application for *U.S. Patent No. 6,109,241*, which was filed on January 26, 1999. He has sworn he invented the patent's subject matter on February 14, 1998. The Engelgau patent discloses an adjustable electronic pedal described in the specification as a "simplified vehicle control [\*\*\*24] pedal assembly that is less expensive, and which uses fewer parts and is easier to package within the vehicle." Engelgau, col. 2, lines 2-5, Supplemental App. 6. Claim 4 of the patent, at issue here, describes:

"A vehicle control pedal apparatus comprising:

a support adapted to be mounted to a vehicle structure;

an adjustable pedal assembly having a pedal arm moveable in fore and aft directions with respect to said support;

a pivot for pivotally supporting said adjustable pedal assembly with respect to said support and defining a pivot axis; and

an electronic control attached to said support for controlling a vehicle system;

said apparatus characterized by said electronic control being responsive to said pivot for providing a signal that corresponds to pedal arm position as said pedal arm pivots about said pivot [\*1737] axis between rest and applied positions wherein the position of said pivot remains constant while said pedal arm moves in fore and aft directions with respect to said pivot." *Id.*, col. 6, lines 17-36, Supplemental App. 8 (diagram numbers omitted).

We agree with the District Court that the claim discloses "a position-adjustable pedal [\*\*\*25] assembly with an electronic pedal position sensor attached to the support member of the pedal assembly. Attaching the sensor to

the support member allows the sensor to remain in a fixed position while the driver adjusts the pedal." 298 F. Supp. 2d, at 586-587.

Before issuing the Engelgau patent the U.S. Patent and Trademark Office (PTO) rejected one of the patent claims that was similar to, but [\*\*718] broader than, the present claim 4. The claim did not include the requirement that the sensor be placed on a fixed pivot point. The PTO concluded the claim was an obvious combination of the prior art disclosed in Redding and Smith, explaining:

"Since the prior art references are from the field of endeavor, the purpose disclosed . . . would have been recognized in the pertinent art of Redding. Therefore it would have been obvious . . . to provide the device of Redding with the . . . means attached to a support member as taught by Smith." *Id.*, at 595.

In other words Redding provided an example of an adjustable pedal and Smith explained how to mount a sensor on a pedal's support structure, and the rejected patent claim merely put these two teachings together.

[\*\*\*26] Although the broader claim was rejected, claim 4 was later allowed because it included the limitation of a fixed pivot point, which distinguished the design from Redding's. *Ibid.* Engelgau had not included Asano among the prior art references, and Asano was not mentioned in the patent's prosecution. Thus, the PTO did not have before it an adjustable pedal with a fixed pivot point. The patent issued on May 29, 2001 and was assigned to Teleflex.

Upon learning of KSR's design for GM, Teleflex sent a warning letter informing KSR that its proposal would violate the Engelgau patent. "Teleflex believes that any supplier of a product that combines an adjustable pedal with an electronic throttle control necessarily employs technology covered by one or more" of Teleflex's patents. *Id.*, at 585. KSR refused to enter a royalty arrangement with Teleflex; so Teleflex sued for infringement, asserting KSR's pedal infringed the Engelgau patent and two other patents. *Ibid.* Teleflex later abandoned its claims regarding the other patents and dedicated the patents to the public. The remaining contention was that KSR's pedal system for GM infringed

127 S. Ct. 1727, \*1737; 167 L. Ed. 2d 705, \*\*718; 2007 U.S. LEXIS 4745, \*\*\*26; 75 U.S.L.W. 4289

claim 4 of the Engelgau patent. [\*\*\*27] Teleflex has not argued that the other three claims of the patent are infringed by KSR's pedal, nor has Teleflex argued that the mechanical adjustable pedal designed by KSR for Ford infringed any of its patents.

C

The District Court granted summary judgment in KSR's favor. After reviewing the pertinent history of pedal design, the scope of the Engelgau patent, and the relevant prior art, the court considered the validity of the contested claim. By direction of 35 U.S.C. § 282, an issued patent is presumed valid. The District Court applied *Graham*'s framework to determine whether under summary-judgment standards KSR had overcome the presumption and demonstrated that claim 4 was obvious in light of the prior art in existence when [\*1738] the claimed subject matter was invented. See § 102(a).

The District Court determined, in light of the expert testimony and the parties' stipulations, that the level of ordinary skill in pedal design was "an undergraduate degree in mechanical engineering (or an equivalent amount of industry experience) [and] familiarity with pedal control systems for vehicles." 298 F. Supp. 2d, at 590. The court then set forth the [\*\*\*28] relevant prior art, including the patents and pedal designs described above.

[\*\*719] Following *Graham*'s direction, the court compared the teachings of the prior art to the claims of Engelgau. It found "little difference." 298 F. Supp. 2d, at 590. Asano taught everything contained in claim 4 except the use of a sensor to detect the pedal's position and transmit it to the computer controlling the throttle. That additional aspect was revealed in sources such as the '068 patent and the sensors used by Chevrolet.

Under the controlling cases from the Court of Appeals for the Federal Circuit, however, the District Court was not permitted to stop there. The court was required also to apply the TSM test. The District Court held KSR had satisfied the test. It reasoned (1) the state of the industry would lead inevitably to combinations of electronic sensors and adjustable pedals, (2) Rixon provided the basis for these developments, and (3) Smith taught a solution to the wire chafing problems in Rixon, namely locating the sensor on the fixed structure of the pedal. This could lead to the combination of Asano, or a pedal like it, with a pedal position sensor.

The conclusion that the [\*\*\*29] Engelgau design was obvious was supported, in the District Court's view, by the PTO's rejection of the broader version of claim 4. Had Engelgau included Asano in his patent application, it reasoned, the PTO would have found claim 4 to be an obvious combination of Asano and Smith, as it had found the broader version an obvious combination of Redding and Smith. As a final matter, the District Court held that the secondary factor of Teleflex's commercial success with pedals based on Engelgau's design did not alter its conclusion. The District Court granted summary judgment for KSR.

With principal reliance on the TSM test, the Court of Appeals reversed. It ruled the District Court had not been strict enough in applying the test, having failed to make "findings as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of [the] invention . . . to attach an electronic control to the support bracket of the Asano assembly." 119 Fed. Appx., at 285 (brackets in original) (quoting *In re Kotzab*, 217 F.3d 1365, 1371 (CA Fed. 2000)). The Court of Appeals held that the District Court was [\*\*\*30] incorrect that the nature of the problem to be solved satisfied this requirement because unless the "prior art references addressed the precise problem that the patentee was trying to solve," the problem would not motivate an inventor to look at those references. 119 Fed. Appx., at 288.

Here, the Court of Appeals found, the Asano pedal was designed to solve the "constant ratio problem" -- that is, to ensure that the force required to depress the pedal is the same no matter how the pedal is adjusted -- whereas Engelgau sought to provide a simpler, smaller, cheaper adjustable electronic pedal. *Ibid.* As for Rixon, the court explained, that pedal suffered from the problem of wire chafing but was not designed to solve it. In the court's view Rixon did not teach anything helpful to Engelgau's purpose. Smith, in turn, did not relate to adjustable pedals and did not "necessarily go to the issue of motivation" [\*1739] to attach the electronic control on the support bracket of the pedal assembly." *Ibid.* When the patents were interpreted in this way, the Court of Appeals held, they would not have led a person of ordinary skill to put a sensor on the sort of pedal described in Asano.

[\*\*\*31] [\*\*720] That it might have been obvious to try the combination of Asano and a sensor was

127 S. Ct. 1727, \*1739; 167 L. Ed. 2d 705, \*\*720; 2007 U.S. LEXIS 4745, \*\*\*31; 75 U.S.L.W. 4289

likewise irrelevant, in the court's view, because "'obvious to try" has long been held not to constitute obviousness.'" *Id.* at 289 (quoting *In re Deuel*, 51 F.3d 1552, 1559 (CA Fed. 1995)).

The Court of Appeals also faulted the District Court's consideration of the PTO's rejection of the broader version of claim 4. The District Court's role, the Court of Appeals explained, was not to speculate regarding what the PTO might have done had the Engelgau patent mentioned Asano. Rather, the court held, the District Court was obliged first to presume that the issued patent was valid and then to render its own independent judgment of obviousness based on a review of the prior art. The fact that the PTO had rejected the broader version of claim 4, the Court of Appeals said, had no place in that analysis.

The Court of Appeals further held that genuine issues of material fact precluded summary judgment. Teleflex had proffered statements from one expert that claim 4 "was a simple, elegant, and novel combination of features," *119 Fed. Appx.* at 290, compared to Rixon, [\*\*\*32] and from another expert that claim 4 was nonobvious because, unlike in Rixon, the sensor was mounted on the support bracket rather than the pedal itself. This evidence, the court concluded, sufficed to require a trial.

## II

### A

We begin by rejecting the rigid approach of the Court of Appeals. Throughout this Court's engagement with the question of obviousness, our cases have set forth an expansive and flexible approach inconsistent with the way the Court of Appeals applied its TSM test here. To be sure, *Graham* recognized the need for "uniformity and definiteness." 383 U.S., at 18, 86 S. Ct. 684, 15 L. Ed. 2d 545. Yet the principles laid down in *Graham* reaffirmed the "functional approach" of *Hotchkiss*, 52 U.S. 248, 11 How. 248, 13 L. Ed. 683. See 383 U.S., at 12, 86 S. Ct. 684, 15 L. Ed. 2d 545. To this end, *Graham* set forth a broad inquiry and invited courts, where appropriate, to look at any secondary considerations that would prove instructive. *Id.* at 17, 86 S. Ct. 684, 15 L. Ed. 2d 545.

Neither the enactment of § 103 nor the analysis in *Graham* disturbed this Court's earlier instructions concerning the need for caution in granting a patent based

on the combination of elements found in the prior art. For over a half century, [\*\*\*33] the Court has held that a "patent for a combination which only unites old elements with no change in their respective functions . . . obviously withdraws what is already known into the field of its monopoly and diminishes the resources available to skillful men." *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 152, 71 S. Ct. 127, 95 L. Ed. 162, 1951 Dec. Comm'r Pat. 572 (1950). This is a principal reason for declining to allow patents for what is obvious. The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. Three cases decided after *Graham* illustrate the application of this doctrine.

In *United States v. Adams*, 383 U.S. 39, 40, 86 S. Ct. 708, 15 L. Ed. 2d 572, 174 Ct. Cl. 1293 (1966), a companion case to *Graham*, the Court considered the obviousness of a "wet battery" that varied from [\*\*721] prior designs in two ways: [1740] It contained water, rather than the acids conventionally employed in storage batteries; and its electrodes were magnesium and cuprous chloride, rather than zinc and silver chloride. The Court recognized that when a patent claims a structure already known in the prior art that is altered by the mere substitution of one [\*\*\*34] element for another known in the field, the combination must do more than yield a predictable result. 383 U.S., at 50-51, 86 S. Ct. 708, 15 L. Ed. 2d 572, 174 Ct. Cl. 1293. It nevertheless rejected the Government's claim that Adams's battery was obvious. The Court relied upon the corollary principle that when the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious. *Id.* at 51-52, 86 S. Ct. 708, 15 L. Ed. 2d 572, 174 Ct. Cl. 1293. When Adams designed his battery, the prior art warned that risks were involved in using the types of electrodes he employed. The fact that the elements worked together in an unexpected and fruitful manner supported the conclusion that Adams's design was not obvious to those skilled in the art.

In *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 90 S. Ct. 305, 24 L. Ed. 2d 258 (1969), the Court elaborated on this approach. The subject matter of the patent before the Court was a device combining two pre-existing elements: a radiant-heat burner and a paving machine. The device, the Court concluded, did not create some new synergy: The radiant-heat burner

127 S. Ct. 1727, \*1740; 167 L. Ed. 2d 705, \*\*721; 2007 U.S. LEXIS 4745, \*\*\*34; 75 U.S.L.W. 4289

functioned just as a burner was expected to function; and the paving machine did [\*\*\*35] the same. The two in combination did no more than they would in separate, sequential operation. *Id.* at 60-62, 90 S. Ct. 305, 24 L. Ed. 2d 258. In those circumstances, "while the combination of old elements performed a useful function, it added nothing to the nature and quality of the radiant-heat burner already patented," and the patent failed under § 103. *Id.* at 62, 90 S. Ct. 305, 24 L. Ed. 2d 258 (footnote omitted).

Finally, in *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 96 S. Ct. 1532, 47 L. Ed. 2d 784 (1976), the Court derived from the precedents the conclusion that when a patent "simply arranges old elements with each performing the same function it had been known to perform" and yields no more than one would expect from such an arrangement, the combination is obvious. *Id.* at 282, 96 S. Ct. 1532, 47 L. Ed. 2d 784.

The principles underlying these cases are instructive when the question is whether a patent claiming the combination of elements of prior art is obvious. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For [\*\*\*36] the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida* and *Anderson's-Black Rock* are illustrative -- a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.

Following these principles may be [\*\*722] more difficult in other cases than it is here because the claimed subject matter may involve more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement. Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having [\*1741] ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the

known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis [\*\*\*37] should be made explicit. See *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006) ("Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness"). As our precedents make clear, however, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.

## B

When it first established the requirement of demonstrating a teaching, suggestion, or motivation to combine known elements in order to show that the combination is obvious, the Court of Customs and Patent Appeals captured a helpful insight. See *Application of Bergel*, 292 F.2d 955, 956-957, 48 C.C.P.A. 1102, 1961 Dec. Comm'r Pat. 504 (1961). As is clear from cases such as *Adams*, a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation [\*\*\*38] the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.

Helpful insights, however, need not become rigid and mandatory formulas; and when it is so applied, the TSM test is incompatible with our precedents. The obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents. The diversity of inventive pursuits and of modern technology counsels against limiting the analysis in this way. In many fields it may be that there is little discussion of obvious techniques or combinations, and it often may be the case that market demand, rather than

127 S. Ct. 1727, \*1741; 167 L. Ed. 2d 705, \*\*722;  
2007 U.S. LEXIS 4745, \*\*\*38; 75 U.S.L.W. 4289

scientific literature, will drive design trends. Granting patent protection [\*\*\*39] to advances that would occur in the ordinary course without real innovation retards progress and may, in the case of patents combining previously known elements, deprive prior inventions of their value or utility.

In the years since the Court of Customs and Patent Appeals set forth the [\*723] essence of the TSM test, the Court of Appeals no doubt has applied the test in accord with these principles in many cases. There is no necessary inconsistency between the idea underlying the TSM test and the *Graham* analysis. But when a court transforms the general principle into a rigid rule that limits the obviousness inquiry, as the Court of Appeals did here, it errs.

#### C

The flaws in the analysis of the Court of Appeals relate for the most part to the court's narrow conception of the obviousness inquiry reflected in its application of the TSM test. In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the [\*1742] patentee controls. What matters is the objective reach of the claim. If the claim extends to what is obvious, it is invalid under § 103. One of the ways in which a patent's subject matter can be proved obvious is [\*\*\*40] by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims.

The first error of the Court of Appeals in this case was to foreclose this reasoning by holding that courts and patent examiners should look only to the problem the patentee was trying to solve. *119 Fed. Appx.*, at 288. The Court of Appeals failed to recognize that the problem motivating the patentee may be only one of many addressed by the patent's subject matter. The question is not whether the combination was obvious to the patentee but whether the combination was obvious to a person with ordinary skill in the art. Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

The second error of the Court of Appeals lay in its assumption that a person of ordinary skill attempting to solve a problem will be led only to those elements of

prior art designed to solve the same problem. *Ibid*. The primary purpose of Asano was solving the constant ratio problem; so, the court concluded, [\*\*\*41] an inventor considering how to put a sensor on an adjustable pedal would have no reason to consider putting it on the Asano pedal. *Ibid*. Common sense teaches, however, that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle. Regardless of Asano's primary purpose, the design provided an obvious example of an adjustable pedal with a fixed pivot point; and the prior art was replete with patents indicating that a fixed pivot point was an ideal mount for a sensor. The idea that a designer hoping to make an adjustable electronic pedal would ignore Asano because Asano was designed to solve the constant ratio problem makes little sense. A person of ordinary skill is also a person of ordinary creativity, not an automaton.

The same constricted analysis led the Court of Appeals to conclude, in error, that a patent claim cannot be proved obvious merely by showing that the combination of elements was "obvious to try." *Id.*, at 289 (internal quotation marks omitted). When there is a design need or market pressure to solve a problem [\*\*\*42] and there are a finite number of identified, predictable [\*724] solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103.

The Court of Appeals, finally, drew the wrong conclusion from the risk of courts and patent examiners falling prey to hindsight bias. A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning. See *Graham*, 383 U.S., at 36, 86 S. Ct. 654, 15 L. Ed. 2d 545 (warning against a "temptation to read into the prior art the teachings of the invention in issue" and instructing courts to "guard against slipping into the use of hindsight" (quoting *Monroe Auto Equipment Co. v. Heckethorn Mfg. & Supply Co.*, 332 F.2d 406, 412 (CA6 1964))). Rigid preventative rules that deny factfinders recourse to common sense, however, are [\*1743] neither necessary under our case law nor consistent with it.

127 S. Ct. 1727, \*1743; 167 L. Ed. 2d 705, \*\*724; 2007 U.S. LEXIS 4745, \*\*\*42; 75 U.S.L.W. 4289

We note the [\*\*\*43] Court of Appeals has since elaborated a broader conception of the TSM test than was applied in the instant matter. See, e.g., *DyStar Textilfarben GmbH & Co. Deutschland KG v. C. H. Patrick Co.*, 464 F.3d 1356, 1367 (2006) ("Our suggestion test is in actuality quite flexible and not only permits, but *requires*, consideration of common knowledge and common sense"); *Alza Corp. v. Mylan Labs., Inc.*, 464 F.3d 1286, 1291 (2006) ("There is flexibility in our obviousness jurisprudence because a motivation may be found *implicitly* in the prior art. We do not have a rigid test that requires an actual teaching to combine . . ."). Those decisions, of course, are not now before us and do not correct the errors of law made by the Court of Appeals in this case. The extent to which they may describe an analysis more consistent with our earlier precedents and our decision here is a matter for the Court of Appeals to consider in its future cases. What we hold is that the fundamental misunderstandings identified above led the Court of Appeals in this case to apply a test inconsistent with our patent law decisions.

### III

When we apply the standards we have [\*\*\*44] explained to the instant facts, claim 4 must be found obvious. We agree with and adopt the District Court's recitation of the relevant prior art and its determination of the level of ordinary skill in the field. As did the District Court, we see little difference between the teachings of Asano and Smith and the adjustable electronic pedal disclosed in claim 4 of the Engelgau patent. A person having ordinary skill in the art could have combined Asano with a pedal position sensor in a fashion encompassed by claim 4, and would have seen the benefits of doing so.

#### A

Teleflex argues in passing that the Asano pedal cannot be combined with a sensor in the manner described by claim 4 because of the design of Asano's pivot mechanisms. See Brief for Respondents 48-49, and n. 17. Therefore, Teleflex reasons, even if adding a sensor to Asano was obvious, that does not establish that claim 4 encompasses obvious subject matter. This argument was not, however, [\*\*725] raised before the District Court. There Teleflex was content to assert only that the problem motivating the invention claimed by the Engelgau patent would not lead to the solution of combining of Asano with a sensor. See Teleflex's

Response [\*\*\*45] to KSR's Motion for Summary Judgment of Invalidity in No. 02-74586 (ED Mich.), pp. 18-20, App. 144a-146a. It is also unclear whether the current argument was raised before the Court of Appeals, where Teleflex advanced the nonspecific, conclusory contention that combining Asano with a sensor would not satisfy the limitations of claim 4. See Brief for Plaintiffs-Appellants in No. 04-1152 (CA Fed.), pp. 42-44. Teleflex's own expert declarations, moreover, do not support the point Teleflex now raises. See Declaration of Clark J. Radcliffe, Ph.D., Supplemental App. 204-207; Declaration of Timothy L. Andresen, *id.* at 208-210. The only statement in either declaration that might bear on the argument is found in the Radcliffe declaration:

Asano . . . and Rixon . . . are complex mechanical linkage-based devices that are expensive to produce and assemble and difficult to package. It is exactly these difficulties with prior art designs that [Engelgau] resolves. The use of an adjustable pedal with a single pivot reflecting pedal position combined with an electronic control mounted between the [\*1744] support and the adjustment assembly at that pivot was a simple, elegant, and novel combination [\*\*\*46] of features in the Engelgau '565 patent." *Id.* at 206, P16.

Read in the context of the declaration as a whole this is best interpreted to mean that Asano could not be used to solve "the problem addressed by Engelgau '565[] to provide a less expensive, more quickly assembled, and smaller package adjustable pedal assembly with electronic control." *Id.* at 205, P10.

The District Court found that combining Asano with a pivot-mounted pedal position sensor fell within the scope of claim 4. 298 F. Supp. 2d, at 592-593. Given the significance of that finding to the District Court's judgment, it is apparent that Teleflex would have made clearer challenges to it if it intended to preserve this claim. In light of Teleflex's failure to raise the argument in a clear fashion, and the silence of the Court of Appeals on the issue, we take the District Court's conclusion on the point to be correct.

#### B

127 S. Ct. 1727, \*1744; 167 L. Ed. 2d 705, \*\*725; 2007 U.S. LEXIS 4745, \*\*\*46; 75 U.S.L.W. 4289

The District Court was correct to conclude that, as of the time Engelgau designed the subject matter in claim 4, it was obvious to a person of ordinary skill to combine Asano with a pivot-mounted pedal position sensor. There then existed a marketplace that created a strong [\*\*\*47] incentive to convert mechanical pedals to electronic pedals, and the prior art taught a number of methods for achieving this advance. The Court of Appeals considered the issue too narrowly by, in effect, asking whether a pedal designer writing on a blank slate would have chosen both Asano and a modular sensor similar to the ones used in the Chevrolet truckline and disclosed in the '068 patent. The District Court employed this narrow inquiry as well, though it reached the correct result nevertheless. The proper question to have asked was whether a pedal designer of ordinary skill, facing the wide range of needs created by developments in the field of endeavor, [\*\*726] would have seen a benefit to upgrading Asano with a sensor.

In automotive design, as in many other fields, the interaction of multiple components means that changing one component often requires the others to be modified as well. Technological developments made it clear that engines using computer-controlled throttles would become standard. As a result, designers might have decided to design new pedals from scratch; but they also would have had reason to make pre-existing pedals work with the new engines. Indeed, upgrading its [\*\*\*48] own pre-existing model led KSR to design the pedal now accused of infringing the Engelgau patent.

For a designer starting with Asano, the question was where to attach the sensor. The consequent legal question, then, is whether a pedal designer of ordinary skill starting with Asano would have found it obvious to put the sensor on a fixed pivot point. The prior art discussed above leads us to the conclusion that attaching the sensor where both KSR and Engelgau put it would have been obvious to a person of ordinary skill.

The '936 patent taught the utility of putting the sensor on the pedal device, not in the engine. Smith, in turn, explained to put the sensor not on the pedal's footpad but instead on its support structure. And from the known wire-chafing problems of Rixon, and Smith's teaching that "the pedal assemblies must not precipitate any motion in the connecting wires," Smith, col. 1, lines 35-37, Supplemental App. 274, the designer would know to place the sensor on a nonmoving part of the pedal

structure. The most obvious nonmoving point on the structure from which a sensor can [\*\*1745] easily detect the pedal's position is a pivot point. The designer, accordingly, would follow Smith [\*\*\*49] in mounting the sensor on a pivot, thereby designing an adjustable electronic pedal covered by claim 4.

Just as it was possible to begin with the objective to upgrade Asano to work with a computer-controlled throttle, so too was it possible to take an adjustable electronic pedal like Rixon and seek an improvement that would avoid the wire-chafing problem. Following similar steps to those just explained, a designer would learn from Smith to avoid sensor movement and would come, thereby, to Asano because Asano disclosed an adjustable pedal with a fixed pivot.

Teleflex indirectly argues that the prior art taught away from attaching a sensor to Asano because Asano in its view is bulky, complex, and expensive. The only evidence Teleflex marshals in support of this argument, however, is the Radcliffe declaration, which merely indicates that Asano would not have solved Engelgau's goal of making a small, simple, and inexpensive pedal. What the declaration does not indicate is that Asano was somehow so flawed that there was no reason to upgrade it, or pedals like it, to be compatible with modern engines. Indeed, Teleflex's own declarations refute this conclusion. Dr. Radcliffe states that [\*\*\*50] Rixon suffered from the same bulk and complexity as did Asano. See *id.*, at 206. Teleflex's other expert, however, explained that Rixon was itself designed by adding a sensor to a pre-existing mechanical pedal. See *id.*, at 209. If Rixon's base pedal was not too flawed to upgrade, then Dr. Radcliffe's declaration does not show Asano was either. Teleflex may have made a plausible argument that Asano is inefficient as compared [\*\*727] to Engelgau's preferred embodiment, but to judge Asano against Engelgau would be to engage in the very hindsight bias Teleflex rightly urges must be avoided. Accordingly, Teleflex has not shown anything in the prior art that taught away from the use of Asano.

Like the District Court, finally, we conclude Teleflex has shown no secondary factors to dislodge the determination that claim 4 is obvious. Proper application of *Graham* and our other precedents to these facts therefore leads to the conclusion that claim 4 encompassed obvious subject matter. As a result, the claim fails to meet the requirement of § 103.

127 S. Ct. 1727, \*1745; 167 L. Ed. 2d 705, \*\*727;  
2007 U.S. LEXIS 4745, \*\*\*50; 75 U.S.L.W. 4289

We need not reach the question whether the failure to disclose Asano during the prosecution of Engelgau voids the presumption of validity given [\*\*\*51] to issued patents, for claim 4 is obvious despite the presumption. We nevertheless think it appropriate to note that the rationale underlying the presumption -- that the PTO, in its expertise, has approved the claim -- seems much diminished here.

#### IV

A separate ground the Court of Appeals gave for reversing the order for summary judgment was the existence of a dispute over an issue of material fact. We disagree with the Court of Appeals on this point as well. To the extent the court understood the *Graham* approach to exclude the possibility of summary judgment when an expert provides a conclusory affidavit addressing the question of obviousness, it misunderstood the role expert testimony plays in the analysis. In considering summary judgment on that question the district court can and should take into account expert testimony, which may resolve or keep open certain questions of fact. That is not the end of the issue, however. The ultimate judgment of obviousness is a legal determination. *Graham*, 383 U.S., at 17, 86 S. Ct. 684, 15 L. Ed. 2d 545. Where, as here, the content of the prior art, the scope of the patent [\*1746] claim, and the level of ordinary skill in the art are not in material dispute, and [\*\*\*52] the obviousness of the claim is apparent in light of these factors, summary judgment is appropriate. Nothing in the declarations proffered by Teleflex prevented the District Court from reaching the careful conclusions underlying its order for summary judgment in this case.

\* \* \*

We build and create by bringing to the tangible and palpable reality around us new works based on instinct, simple logic, ordinary inferences, extraordinary ideas, and sometimes even genius. These advances, once part of our shared knowledge, define a new threshold from which innovation starts once more. And as progress beginning from higher levels of achievement is expected in the normal course, the results of ordinary innovation are not the subject of exclusive rights under the patent laws. Were it otherwise patents might stifle, rather than promote, the progress of useful arts. See *U.S. Const.*, *Art. I*, § 8, cl. 8. These premises led to the bar on patents claiming obvious subject matter established in *Hotchkiss* and codified in § 103. Application of the bar must not be confined within a test or formulation too constrained to serve its purpose.

KSR provided convincing evidence that mounting a modular [\*\*\*53] sensor on a fixed pivot point of the Asano pedal was a design step well within the [\*\*728] grasp of a person of ordinary skill in the relevant art. Its arguments, and the record, demonstrate that claim 4 of the Engelgau patent is obvious. In rejecting the District Court's rulings, the Court of Appeals analyzed the issue in a narrow, rigid manner inconsistent with § 103 and our precedents. The judgment of the Court of Appeals is reversed, and the case remanded for further proceedings consistent with this opinion.

It is so ordered.

LEXSEE 437 F.3D 1157

MEDICHEM, S.A., Plaintiff-Appellee, v. ROLABO, S.L., Defendant-Appellant.

05-1179, 05-1248

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

*437 F.3d 1157; 2006 U.S. App. LEXIS 2653; 77 U.S.P.Q.2D (BNA) 1865*

February 3, 2006, Decided

**SUBSEQUENT HISTORY:** Rehearing denied by, Rehearing, en banc, denied by *Medichem, S.A. v. Rolabo, S.L.*, 2006 U.S. App. LEXIS 7669 (Fed. Cir., Mar. 15, 2006)

**PRIOR HISTORY:** [\*\*1]Appealed from: United States District Court for the Southern District of New York. Judge Jed S. Rakoff.

*Medichem, S.A. v. Rolabo, S.L.*, 2004 U.S. Dist. LEXIS 23697 (S.D.N.Y., Nov. 19, 2004)

**DISPOSITION:** AFFIRMED-IN-PART, REVERSED-IN-PART.

**COUNSEL:** John G. Taylor, Frommer Lawrence & Haug LLP, of New York, New York, argued for plaintiff-appellee. With him on the brief were Barry S. White and James K. Stronski.

Thomas P. Heneghan, Michael Best & Friedrich LLP, of Madison, Wisconsin, argued for defendant-appellant. With him on the brief were Jeffrey S. Ward and Charlene L. Yager.

**JUDGES:** Before SCHALL, GAJARSA, DYK, Circuit Judges.

**OPINION BY:** GAJARSA

**OPINION**

[\*1160] GAJARSA, Circuit Judge.

This is the second round of a protracted litigation to establish priority of invention between Stampa et al's U.S. Patent No. 6,084,100 ("the '100 patent"), assigned to

Medichem, S.A. ("Medichem"), and Jackson's U.S. Patent No. 6,093,827 ("the '827 patent"), assigned to Rolabo, S.L. ("Rolabo"). In the first round appealed to this court, we remanded to the district court, requiring it to establish an interference-in-fact under 35 U.S.C. § 291 before determining priority. *Medichem, S.A. v. Rolabo, S.L.*, 353 F.3d 928 (Fed. Cir. 2003) ("Medichem II"). Rolabo now appeals [\*\*2] from the judgment on remand, in which the United States District Court for the Southern District of New York found the existence of an interference-in-fact and awarded priority of invention to Medichem. See *Medichem, S.A. v. Rolabo, S.L., Memorandum Order*, 2004 U.S. Dist. LEXIS 23697, No. 01 Civ. 3087, 2004 WL 2674632 (S.D.N.Y. Nov. 22, 2004) ("Medichem III"). For the reasons discussed below, we affirm the judgment of the district court on the proper establishment of the interfering subject matter and on the finding of the existence of an interference-in-fact. We reverse, however, the district court's award of priority to Medichem, based on the insufficiency of the evidence that Medichem introduced at trial to corroborate the testimony of its inventors regarding reduction to practice of the invention.

BACKGROUND

A. The Patents

Medichem and Rolabo are both pharmaceutical manufacturers based in Barcelona, Spain. Rolabo's '827 patent and Medichem's '100 patent both claim a process for making loratadine from two precursor chemicals via a chemical reaction known as the McMurry reaction. Loratadine is the active ingredient in the allergy medication Claritin (R). McMurry reactions involve the [\*\*3] coupling of two starting materials in the presence of low-valent titanium. In general, McMurry reactions

can lead to two types of products, diols and alkenes; loratadine, the desired end product of this reaction, is an alkene. McMurry reactions can be optimized for alkene production by adjusting various reaction parameters, such as the temperature and length of the reaction in this case, and also by adding additional reactants. The only significant difference between the processes claimed by Medicchem<sup>1</sup> and Rolabo<sup>2</sup> is that Medicchem's [\*1161] process requires the reaction to be carried out in the presence of a type of chemical known as a tertiary amine.<sup>3</sup> In contrast, the Rolabo process permits by not excluding, but does not require, the presence of a tertiary amine. Conceptually, therefore, the Medicchem invention, which requires a tertiary amine, is a species within the genus of the Rolabo invention.

1 Claims 1 and 2 of Medicchem's '100 patent read:

1. A process for the preparation of loratadine consisting of reacting, in an organic solvent and in the presence of a tertiary amine, 8-chloro-5,6-dihydrobenzo[5,6]cyclohepta[1,2-b]pyridin-11-one, of formula VII with a low-valent titanium species. (emphasis added).

2. The process of claim 1, wherein the low-valent titanium species are generated by reduction of titanium tetrachloride with zinc dust.

[\*\*4]

2 Claims 1 and 17 of Rolabo's '827 patent read:

1. A process for preparing 5,6-dihydro-11H-dibenzo[a,d]cyclohept-11-enes comprising reacting a dibenzosuberone or an aza derivative thereof with an aliphatic ketone in the presence of low valent titanium wherein said low valent titanium is generated by zinc.

17. A process as claimed in claim 1 for preparing Loratadine.

3 A tertiary amine is a compound in which nitrogen is bonded three times to carbon. A commonly used tertiary amine is pyridine.

#### B. Proceedings to Date

Medicchem brought an action under 35 U.S.C. § 291, alleging an interference-in-fact between the '100 and '827 patents, claiming priority of invention, and seeking invalidation of Rolabo's patent under 35 U.S.C. § 102(g). Transcript of Verdict at 653-67, *Medicchem, S.A. v. Rolabo, S.L., No. 01 Civ. 03087, 2002 U.S. Dist. LEXIS 27086 (S.D.N.Y. May 8, 2002)* ("Medicchem I"). Because Rolabo was the party with the earlier effective filing date, Medicchem sought to establish priority by proving an actual reduction to practice that was even earlier.<sup>4</sup> After a bench trial, the district [\*\*5] court found that there was no interference-in-fact between the claimed inventions, but it nonetheless awarded priority to Medicchem. Id.

4 Rolabo's effective filing date is February 26, 1997 and Medicchem's is May 30, 1997.

On appeal, this court vacated the priority holding, opining that because the existence of an interference-in-fact is a jurisdictional requirement under 35 U.S.C. § 291, it was therefore a precondition to the district court's consideration of the priority issue. *Medicchem II*, 353 F.3d at 935-36. We explained that the first step in an interference analysis is for the court to determine whether an interference exists under 35 U.S.C. § 291 by asking whether the "patents... have the same or substantially the same subject matter in similar form as that required by the PTO pursuant to 35 U.S.C. § 135." *Id.* at 934 (internal quotations omitted). In order to make this determination, we use the "two-way" test which states that two patents interfere only if (1) invention A either anticipates or renders obvious invention B, where Party A [\*\*6] 's claimed invention is presumed to be prior art vis-a-vis Party B and (2) vice versa. *Id.* (citing *Eli Lilly & Co. v. Bd. of Regents of the Univ. of Wash.*, 334 F.3d 1264, 1268 (Fed. Cir. 2003)).

In Medicchem II, we held that Medicchem's claims to the "species" would clearly anticipate Rolabo's genus claim if the Medicchem patent were assumed to be prior art. *Id.* at 934-35. Thus, we held that the first prong of the two-way test was clearly satisfied. *Id.* at 935. However, we remanded to the district court for a determination of

437 F.3d 1157, \*1161; 2006 U.S. App. LEXIS 2653, \*\*6;  
77 U.S.P.Q.2D (BNA) 1865

whether the second prong was also satisfied—namely, whether Rolabo's [\*1162] genus claim, if prior art, would either anticipate or render obvious Medicchem's species claim. *Id.* at 935. We explained that "as the '827 patent contains genus claims and the '100 patent contains species claims, an arrangement that assumes that the '827 patent is prior art does not necessarily anticipate or make obvious the narrower claims of the '100 patent." *Id.*

On remand, the district court held that "assuming arguendo [pursuant to the two-way test] the priority of the '827 patent, claims 1 and 17 of the '827 patent clearly anticipate and render [\*7] obvious the adding of a tertiary amine, as in the '100 patent." *Medicchem III, 2004 U.S. Dist. LEXIS 23697, 2004 WL 2674632 at \*7.* Although the court went on to explain its holding on obviousness grounds, it was silent about the reasons underlying its apparent determination that Rolabo's genus claims would also anticipate Medicchem's species claim. Instead, it improperly recharacterized our remand instructions as "reducing to the question of whether it would be 'obvious' to add tertiary amine to a McMurry reaction to make loratadine." <sup>5</sup> *Id.* (emphasis added).

5 In so doing, the court appears not to have separately considered the question of whether the '827 patent, if taken as prior art, would anticipate the '100 patent.

The court then correctly stated that:

Determining obviousness requires consideration of two factors: 1) whether the prior art would have suggested to one of ordinary skill in the art that he should carry out the claimed process; and 2) whether the prior art would have also revealed that in carrying out the process, one of ordinary skill would have a reasonable expectation of success.

*Id.* The district court proceeded to articulate [\*8] factual bases for its obviousness holding, which included (1) an article that pointed to the use of amines to improve yields in coupling reactions, (2) testimony by Rolabo's expert about additional such prior art, and (3) evidence that such prior art had actually motivated Medicchem's inventor's to try adding tertiary amine to the reaction mixture. *Medicchem III, 2004 U.S. Dist. LEXIS 23697, 2004 WL 2674632 at \*7-8.*

Having found the two-way test's second prong to be satisfied on both anticipation and obviousness grounds, the district court concluded that the Medicchem and Rolabo patents interfered, a finding that gave it jurisdiction over the priority dispute pursuant to 35 U.S.C. § 291. It awarded priority to Medicchem, after finding that the invention claimed in the '100 patent was reduced to practice prior to the constructive reduction to practice date of Rolabo's invention. See 2004 U.S. Dist. LEXIS 23697, [WL] at \*10-11 (referring to Medicchem I and stating that the court "reinstates and reaffirms its former priority ruling").

In finding reduction to practice, the court neither explicitly discussed the legal requirement that reduction to practice be corroborated by independent evidence, [\*9] nor made a factual finding of corroboration. However, it dismissed Rolabo's argument that Medicchem's inventors were not credible as a result of having fraudulently backdated documents that it had offered to show reduction to practice in 1995. The court thus affirmed its finding in Medicchem I that Medicchem had provided adequate proof of reduction to practice in 1996. The court did so notwithstanding its previous observation that "the willingness of Medicchem to fraudulently backdate [evidence of reduction to practice in 1995], coupled with Medicchem's less than punctilious recordkeeping practices . . . does convince the Court that it cannot place the same reliance on plaintiff's testimony and documents as it might otherwise have." Transcript of Verdict at 658, Medicchem. However, the court apparently adhered to [\*1163] its view that Medicchem's fraudulent backdating was "chiefly a belated attempt to deal with their noncompliance with [certain] regulatory requirements." *Id.* The Medicchem III court therefore reaffirmed its award of priority to Medicchem, and Rolabo appealed on February 9, 2005. This court has jurisdiction pursuant to 28 U.S.C. § 1295 [\*10] (a)(1).

As an aside, we wish to note that in parallel with the district court proceedings under 35 U.S.C. § 291, the Board of Patent Appeals and Interferences ("Board") has been considering essentially the same interference and priority issues pursuant to 35 U.S.C. § 135. See *Stampa v. Jackson, 2002 Pat. App. LEXIS 191, 65 U.S.P.Q.2d 1942 (B.P.A.I. 2002)* (involving an interference between Medicchem's then-pending reissue application and both Rolabo's patent and a pending continuation application thereof, giving rise to Patent Interference Nos. 105,069 and 105,212). The Board held that the district court's

437 F.3d 1157, \*1163; 2006 U.S. App. LEXIS 2653, \*\*10;  
 77 U.S.P.Q.2D (BNA) 1865

holding in *Medichem I* did not bar the Board proceedings on grounds of issue preclusion. See *id.* at 1945-47.

Shortly after the district court's remand decision in *Medichem III*, the Board resolved the interference in favor of Rolabo, reaching a conclusion opposite to that of the district court. See *Stampa v. Jackson*, 76 U.S.P.Q.2d (BNA) 1105, *Inter. Nos. 105,069 & 105,212, 2005 Pat. App. LEXIS 12, 2005 WL 596770 (B.P.A.I. January 25, 2005)*. Central to its decision was *Medichem's* failure to corroborate its account of an alleged actual reduction [\*11] to practice with evidence independent of its inventors' testimony. 76 U.S.P.Q.2d (BNA) 1105, 2005 Pat. App. LEXIS 12, [WL] at \*19-20. The Board noted that "all of the evidence regarding an experiment on May 7, 1996 which is said to have obtained loratadine via a process of the count and conducted by [non-inventor] Lola Casas and said to be recorded [in her notebook] is based on the testimony of [Medichem inventors]." 76 U.S.P.Q.2d (BNA) 1105, 2005 Pat. App. LEXIS 12, [WL] at \*15. Significantly, *Medichem* did not produce any testimony from Casas, a failure that the Board perceived as sufficient to permit the inference that Casas' testimony would have been adverse to *Medichem*. 76 U.S.P.Q.2d (BNA) 1105, 2005 Pat. App. LEXIS 12, [WL] at \*20. However, the Board declined to apply such an adverse inference on the grounds that "[Medichem's] case is so weak, we find it unnecessary to draw an inference one way or the other." <sup>6</sup> *Id.* While appellant does not argue that the Board decision as a binding effect on this court, Board decisions nevertheless represent the views of a panel of specialists in the area of patent law. *Medichem* has appealed the Board's decision to this court. See *Stampa v. Jackson*, appeal docketed, Nos. 06-1004 & -1029 (Fed. Cir. Oct. 6, 2004 & Oct. 24, 2004).

6 A final judgment on the merits was issued the same day. See *Stampa v. Jackson*, 76 U.S.P.Q.2d (BNA) 1105, *Inter. Nos. 105,069 & 105,212, 2005 Pat. App. LEXIS 12, 2005 WL 596770 (B.P.A.I. January 25, 2005)*. The Board later denied *Medichem's* request for rehearing, stating inter alia that "the importance of Lola Casas' testimony is manifest. She is the principal, if not the only, corroborating witness on the issue of whether an actual reduction to practice took place." See *Stampa v. Jackson*, *Inter. Nos. 105,069 & 105,212, 2006 Pat. App. LEXIS 40, 2005 WL 1541082 (B.P.A.I. June 27, 2005)*.

## [\*\*12] DISCUSSION

There are three issues in this case--namely, whether the district court (1) erred in finding the existence of an interference-in-fact; (2) committed reversible error in failing to formally define a count corresponding to the interfering subject matter; and (3) erred in awarding priority of invention to *Medichem* based on the oral testimony of *Medichem* co-inventors, testimony that Rolabo claims was not corroborated by independent evidence, and thus should not have been credited in the final determination of whether reduction to practice was established before the critical date.

### [\*1164] A. Existence of an Interference-in-Fact

For the reasons explained below, we agree that under the second prong of the two-way test for obviousness, Rolabo's genus claim renders obvious the *Medichem* species claim. We therefore affirm the lower court's finding of an interference-in-fact without needing to review the district court's unsupported factual finding that the second prong of the two-way test was independently satisfied on anticipation grounds.

#### 1. Standard of Review

In reviewing a district court's finding of an interference-in-fact pursuant to the two-way test, this court reviews, where [\*13] necessary, both the subsidiary findings of anticipation and/or obviousness as they relate to the application of the test. See *Medichem II*, 353 F.3d at 932 (articulating the standard of review for findings of an interference-in-fact under 35 U.S.C. § 133). Here, because we agree with the district court's subsidiary finding of obviousness, which is sufficient to support its finding of an interference-in-fact, it is not necessary for us to review the court's finding of anticipation.

Obviousness under 35 U.S.C. § 103 is a legal conclusion that is reviewed de novo; however, it is based in turn on underlying factual determinations which are reviewed for clear error. *Id.* Under the clear error standard, a reversal is permitted "only when this court is left with a 'definite and firm conviction' that the district court was in error." *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1275 (Fed. Cir. 2004) (quoting *Amhil Enters. Ltd. v. Wawa, Inc.*, 81 F.3d 1554, 1562 (Fed. Cir. 1996)).

#### 2. Obviousness

The ultimate determination of whether an invention would have been obvious under 35 U.S.C. § 103 [\*\*14] (a) is a legal conclusion based on the factual Graham findings, e.g., "(1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; and (3) the differences between the claimed invention and the prior art." *Velander v. Garner*, 348 F.3d 1359, 1363 (Fed. Cir. 2003) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S. Ct. 684, 15 L. Ed. 2d 545 (1966)).

This court has held that if all the elements of an invention are found in a combination of prior art references:

a proper analysis under § 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success.

Id.

The first requirement, the motivation to combine references, serves to prevent hindsight bias. See *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1351 (Fed. Cir. 2001) ("To prevent hindsight invalidation of patent [\*\*15] claims, the law requires some 'teaching, suggestion or reason' to combine cited references.") (quoting *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573 (Fed. Cir. 1997)). In making obviousness determinations, the test is "whether the subject matter of the claimed inventions would have been obvious to one skilled in the art at the time the inventions were made, *not* what would be obvious to a judge after reading the patents in suit and hearing the testimony." *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 1092 (Fed. Cir. 1985). Whether such a motivation [\*1165] has been demonstrated is a question of fact. See *Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1348 (Fed. Cir. 2000). Evidence of a motivation to combine prior art references "may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to

be solved." *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1125 (Fed. Cir. 2000).

When a piece of prior art "suggests that the line of development flowing from the reference's disclosure is unlikely [\*\*16] to be productive of the result sought by the applicant" the piece of prior art is said to "teach away" from the claimed invention. *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). As with other subsidiary obviousness inquiries, "what a reference teaches and whether it teaches toward or away from the claimed invention are questions of fact." *Winner*, 202 F.3d at 1349 (internal quotations omitted). However, obviousness must be determined in light of all the facts, and there is no rule that a single reference that teaches away will mandate a finding of nonobviousness. Likewise, a given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine. See *id.* at 1349 n.8 ("The fact that the motivating benefit comes at the expense of another benefit, however, should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another. Instead, the benefits, both lost and gained, should be weighed against one another.") Where the prior art contains "apparently conflicting" teachings (i.e., where some references teach the combination and others [\*17] teach away from it) each reference must be considered "for its power to suggest solutions to an artisan of ordinary skill. . . . considering the degree to which one reference might accurately discredit another." *In re Young*, 927 F.2d 588, 591 (Fed. Cir. 1991).

As stated above, an obviousness determination requires not only the existence of a motivation to combine elements from different prior art references, but also that a skilled artisan would have perceived a reasonable expectation of success in making the invention via that combination. While the definition of "reasonable expectation" is somewhat vague, our case law makes clear that it does not require a certainty of success. See *In re O'Farrell*, 853 F.2d 894, 903-04 (Fed. Cir. 1988) ("Obviousness does not require absolute predictability of success. . . . All that is required is a reasonable expectation of success.").

However, to have a reasonable expectation of success, one must be motivated to do more than merely to "vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result,

where the prior art gave either no indication of which parameters [\*\*18] were critical or no direction as to which of many possible choices is likely to be successful." *Id.* at 903. Similarly, prior art fails to provide the requisite "reasonable expectation" of success where it teaches merely to pursue a "general approach that seemed to be a promising field of experimentation, where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it." *Id.*

The district court's finding of a reasonable expectation of success is a question of fact, which we review for clear error. See *Ruiz*, 357 F.3d at 1275 (explaining that the obviousness determination rests on "various factual findings that this court reviews for clear error following a bench trial"); *Brown & Williamson*, 229 F.3d at 1129 [\*1166] (reviewing the district court's finding of reasonable expectation of success under the clear error standard); see also *Velander v. Garner*, 348 F.3d 1359, 1376 (Fed. Cir. 2003) (reviewing the Board of Patent Appeals and Interferences' finding of a reasonable expectation of success under a "substantial evidence" standard).

### 3. Analysis

Rolabo argues that the [\*\*19] district court erred in finding that the Medicchem invention (which uses a tertiary amine) would have been obvious over the broader Rolabo invention (which does not require it). Specifically, it appears to argue both that the prior art contained no motivation to combine references so as to have encouraged one reasonably skilled in the art to have added a tertiary amine to a McMurry reaction and that an artisan, even if motivated to add a tertiary amine to Rolabo's process, would have had no reasonable expectation of succeeding in making loratadine via a McMurry reaction in the presence of a tertiary amine.

In support of its arguments, Rolabo cites the trial testimony of an expert witness who explained that a seminal review article in the field showed that a tertiary amine could have "a positive effect, a negative effect, and in some cases, both a positive and negative effect" on the McMurry reaction. Rolabo goes on to cite prior art references that disclose negative effects and essentially argues that the existence of prior art references that teach away from the invention clearly negates the motivation to combine and that the district court's finding of motivation was clearly erroneous. [\*\*20] We disagree.

Granted, it is clear that the prior art disclosed not only potential advantages of using a tertiary amine in a McMurry reaction but also potential disadvantages. On the one hand, some pieces of prior art taught that low concentrations of a tertiary amine could sometimes be used to improve the yield of reactions or to avoid the formation of undesirable rearranged products. On the other hand, other references reported that tertiary amines could sometimes promote the formation of undesirable diol side-products and that when they were used as the reaction solvent (i.e., when tertiary amines are present at their highest possible concentrations), they could stop the reaction completely.

We also note the ambivalence of Medicchem co-inventor Dr. Onrubia toward the introduction of a tertiary amine to the reaction mixture. On the one hand, she testified that she had added a tertiary amine "because the literature said that it might be possible to use tertiary amines in the reaction, that it wouldn't interfere, that it wasn't incompatible, and it's habitual in these circumstances to try various options until you get the reaction to work." On the other hand, when asked, "Is this purely [\*\*21] hit or miss or is there some logical cause . . . for believing that tertiary amine would add something?" she responded: "Frankly, as an organic chemist I have no reason to say that there were grounds for expecting anything from the addition of tertiary amine."

As we have explained above, the fact that some teachings in the prior art conflict with others does not render the findings of the district court clearly erroneous *per se*. Rather, the prior art must be considered as a whole for what it teaches. We understand the prior art, viewed as a whole, to teach that the addition of a tertiary amine sometimes works to improve the yield of McMurry reactions, especially when a tertiary amine is used in relatively low concentrations. In light of this, we cannot say that the district court clearly erred in finding that the prior art would have provided the skilled artisan with a [\*1167] motivation to combine references so as to use pyridine in the McMurry reaction. We wish to emphasize that this is not a case where the prior art's lack of definiteness or certainty about the result of using a tertiary amine in a specific reaction system renders the inventive subject matter "obvious to [\*\*22] try" but not obvious. While we have made clear that "obvious to try" is not the standard under § 103, . . . the meaning of this maxim is sometimes lost." *In re O'Farrell*, 853 F.2d 894,

437 F.3d 1157, \*1167; 2006 U.S. App. LEXIS 2653, \*\*22;  
77 U.S.P.Q.2D (BNA) 1865

903 (*Fed. Cir. 1988*). In O'Farrell, we opined that:

[This] admonition . . . has been directed mainly at two kinds of error[, namely where] . . . what would have been "obvious to try" would have been . . . to vary all parameters or try each of numerous possible choices . . . where the prior art gave . . . no direction as to which of many possible choices is likely to be successful[or] . . . to explore . . . a promising field of experimentation, where the prior art gave only general guidance . . .

*Id.* (citations omitted). In the instant case there are not numerous parameters to vary. Rather, the principal parameter is the concentration of tertiary amine that should be used, and the prior art teaches that if the tertiary amine were to have any positive effect at all, it would be when it was present at low concentrations. Likewise, this is not a case where the prior art gives merely general guidance. In contrast, the guidance is quite clear—namely, that [\*\*23] McMurry reactions of this kind can sometimes be optimized by adding low levels of a tertiary amine.

For the aforementioned reasons, we find no clear error in the district court's determination that skilled artisans in possession of the Rolabo patent and the prior art would have not only been motivated to add a tertiary amine but that they would have possessed a reasonable expectation that they would succeed in optimizing the reaction. Reviewing *de novo* the trial court's application of these factual findings to reach the legal conclusion of obviousness, we likewise find no error. Accordingly, we agree with the district court's determination that the addition of a tertiary amine to a McMurry reaction would have been obvious in view of the Rolabo patent and the prior art. Because this obviousness finding satisfies the second prong of the two-way test for an interference-in-fact, we affirm the district court's determination that an interference-in-fact existed.

As a final matter, we note that we find no merit in Rolabo's contention that we should exclude from the subject matter of the interference that portion of its invention that is directed to running reactions where titanium [\*\*24] is present in specific concentration ranges (claims 10 and 11 of the '827 patent). Claim 10

requires a relative titanium concentration of 1.5:1 to 4:1, and claim 11 requires a ratio of 2:1 to 3:1. The district court relied on the testimony of Medicchem's expert witness, Dr. Finney, in holding that all of the various claims of the '827 patent were "essentially identical to one another and substantially the same as claim 2 of Medicchem's patent." See *Medicchem III, 2004 U.S. Dist. LEXIS 23697, 2004 WL 2674632* at \*4. Rolabo argues that Finney's expert testimony was "conclusory" and therefore insufficient to establish an interference. However, it is clear from the record that Finney's testimony was far from conclusory. In fact, Finney provided a solid factual basis for his opinion, stating that

"claim 10 says that you should have between, a ratio of one and a half to 4 to 1 titanium to dibenzosuberone. Claim 11 states the range should be 2 to 1 to 3 to 1. These are both perfectly normal ranges. And in fact, the patent examples in the '827 [Rolabo's] patent specify I think about a 2.2 to 1 ratio . . ."

[\*1168] Indeed, other evidence of record also supports the conclusion that these are nominal [\*\*25] ranges. The Banerji reference discloses ratios of 2:1 and 1:1, Ishida discloses ratios of 1.5:1, 2.5:1 and 5:1, and Lenoir discloses a ratio of about 1:1.

In short, it is clear that Rolabo's claims 10 and 11 are directed to titanium ratios that are entirely within the range of the prior art, and this fact is dispositive. This court has held that "selecting a narrow range from within a somewhat broader range disclosed in a prior art reference is no less obvious than identifying a range that simply overlaps a disclosed range." *In re Peterson, 315 F.3d 1325, 1330 (Fed. Cir. 2003)*. Moreover, when "the claimed ranges are completely encompassed by the prior art, the conclusion is even more compelling than in cases of mere overlap." *Id.* We have explained that the "normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages." *Id.* Therefore, because Rolabo's claims 10 and 11 are directed to ratios that are entirely within the prior art, the district court properly held those claims to be part of the interfering subject [\*\*26] matter pursuant to the two-way test.

#### B. Identification of Interfering Subject Matter

Having affirmed the district court's determination that an interference-in-fact exists, and that it properly includes those claims directed to specific titanium ratios, this court turns to address Rolabo's procedural argument that the district court erred when it failed to comply with the Board's practice of articulating a precise count of the interference prior to making priority determinations.

This court has not yet addressed "whether district courts handling interfering patent suits under § 291 must define this interfering subject matter in a way similar to a count." *Slip Track Sys., Inc. v. Metal-Lite, Inc.*, 304 F.3d 1256, 1264 (Fed. Cir. 2002). Nevertheless, we have made clear that at least "a single description of the interfering subject matter is necessary for a determination of priority." Id.

That said, *SlipTrack* does not require a court to refer explicitly to the interfering subject matter as a "count," and we believe that in this case the district court was clear about the identity of the interfering subject matter, stating in its opinion "all the various claims [\*27] of the '827 patent are essentially identical to one another and substantially the same as claim 2 of Medicchem's patent." *Medichem III*, 2004 U.S. Dist. LEXIS 23697, 2004 WL 2674632 at \*4. Moreover, to the extent that the district court may not have been clear about whether the tertiary amine limitation was part of the interfering subject matter, we can resolve this issue on appeal. See *Slip Track*, 304 F.3d at 1264-65 (holding that where "the parties . . . dispute only whether one limitation is part of the interfering subject matter, and determination of this issue is dependent upon issues of law alone, we will resolve this issue on appeal.") Accordingly, we hold that the interfering subject matter in this case does not include the limitation of the tertiary amine, and corresponds to claim 17 of Rolabo's '827 patent. See *id.* 1265 ("Since the claims of the '760 patent do not include a wallboard . . . the wallboard cannot be an element of the interfering subject matter in this case, even though it is a limitation in the claims of the '203 patent.")<sup>7</sup>

<sup>7</sup> We note that in parallel interference proceedings, pursuant to 35 U.S.C. § 135, the Board reached a similar definition of the count. See *Stampa v. Jackson*, 2002 Pat. App. LEXIS 191, 65 U.S.P.Q.2d 1942, 1948 (B.P.A.I. 2002) (defining the count as Jackson's (Rolabo's) claim 17).

[\*\*28] [\*1169] C. Priority of Invention

Finally, we review the district court's award of priority of invention to Medicchem. Because the Medicchem '100 patent issued from an application that had a later effective filing date than did Rolabo's '827 patent application, see *supra* note 4, Medicchem bears the burden of establishing priority by a preponderance of the evidence. See *Eli Lilly & Co. v. Aradigm Corp.*, 376 F.3d 1352, 1365 (Fed. Cir. 2004) ("Under 35 U.S.C. § 291, a party that does not have the earliest effective filing date needs only to demonstrate by a preponderance of the evidence that it was the first to invent if the two patents or applications at issue were co-pending before the PTO . . . .") . Medicchem bears no heightened burden, because neither patent enjoys a statutory presumption of validity. See *id.* ("The presumption of validity is nonexistent and the preponderance of the evidence burden is appropriate even if both of the patents have issued by the time a section 291 interference proceeding is initiated in a district court.").

We have held that "priority of invention goes to the first party to reduce an invention to practice unless the [\*\*29] other party can show that it was the first to conceive of the invention and that it exercised reasonable diligence in later reducing that invention to practice." *Cooper v. Goldfarb*, 154 F.3d 1321, 1327 (Fed. Cir. 1998). Here, because neither party relied on a date of conception, priority is properly awarded to the party that was the first to reduce its invention to practice, either actually or constructively. Rolabo relies on its date of constructive reduction to practice, namely its February 26, 1997 effective filing date. Medicchem, on the other hand, alleges that it achieved an actual reduction to practice in the spring of 1996, a date which if proven would antecede Rolabo's filing date, and thereby entitle it to priority. See *supra* note 4 (effective filing dates).

In order to establish an actual reduction to practice, Medicchem must establish three things: "(1) construction of an embodiment or performance of a process that met all the limitations of the interference count; (2) . . . determination that the invention would work for its intended purpose," *Cooper*, 154 F.3d at 1327; and (3) the existence of sufficient evidence to corroborate [\*30] inventor testimony regarding these events, see *id.* at 1330 ("In order to establish an actual reduction to practice, an inventor's testimony must be corroborated by independent evidence."). The key issue on appeal is the last one, namely whether Medicchem provided adequate corroboration of the inventors' testimony regarding the

alleged actual reduction to practice.

For purposes of conceptual clarity, as well as clarity of language, it should be noted that no similar condition of "corroboration" is imposed on an inventor's notebook, or indeed on any documentary or physical evidence, as a condition for its serving as evidence of reduction to practice. See, e.g., *Mahurkar v. C.R. Bard, Inc.*, 79 F.3d 1572, 1577-78 (Fed. Cir. 1996) (explaining that "this court does not require corroboration where a party seeks to prove conception through the use of physical exhibits because the trier of fact can conclude for itself what documents show, aided by testimony as to what the exhibit would mean to one skilled in the art"); *Price v. Symsek*, 988 F.2d 1187, 1195 (Fed. Cir. 1993) ("Only the inventor's testimony requires corroboration [\*1170] before it [\*31] can be considered."). Of course, the credibility (and therefore the corroborative value) of an inventor's notebook may vary. Nevertheless, a notebook, unlike the oral testimony of an inventor, may be weighed, for whatever it is worth, in the final determination of reduction to practice. However, in a case involving reduction to practice, an unwitnessed notebook is insufficient on its own to support a claim of reduction to practice. See *Reese v. Hurst*, 661 F.2d 1222, 1232 (CCPA 1981) ("The inventors' notebooks are accorded no more weight than the inventors' testimony in this instance, since they were not witnessed or signed and were unseen by any witness until after this inference was declared."); *Hahn v. Wong*, 892 F.2d 1028, 1033 (Fed. Cir. 1989) (stating that "affiants' statements that by a certain date they had 'read and understood' specified pages of Stephen Hahn's laboratory notebooks did not corroborate a reduction to practice . . . because they established only that those pages existed on a certain date . . . [and] did not independently corroborate the statements made on those pages"); *Singh v. Brake*, 222 F.3d 1362, 1370 (Fed. Cir. 2000) [\*32] (stating that Hahn v. Wong did not nullify the value of laboratory notebooks in corroborating conception because "the standard of proof required to corroborate a reduction to practice [is] more stringent . . . than that required to corroborate a conception.").<sup>8</sup> Once properly admitted into evidence, documentary and physical evidence is assigned probative value and collectively weighed to determine whether reduction to practice has been achieved. This is what is meant by the maxim that documentary and physical evidence do not require "corroboration."

<sup>8</sup> Cf. *Stern v. Trs. of Columbia Univ.*, 434 F.3d 1375, 2006 U.S. App. LEXIS 1015, No. 05-1291, slip op. at 5 (Fed. Cir. Jan. 17, 2006) ("Regardless of the contents of the notebooks, unwitnessed laboratory notebooks on their own are insufficient to support his claim [of conception, and therefore] of co-inventorship.").

### 1. Corroboration

Credibility concerns undergird the corroboration requirement, the purpose of which is to prevent fraud. See *Chen v. Bouchard*, 347 F.3d 1299, 1309 (Fed. Cir. 2003) ("The purpose of corroboration . . . is to prevent fraud, by providing independent confirmation of the inventor's testimony.") (internal [\*33] quotations omitted). As such, the corroboration requirement provides an additional safeguard against courts being deceived by inventors who may be tempted to mischaracterize the events of the past through their testimony. See *Mahurkar*, 79 F.3d at 1577 ("While perhaps prophylactic in application given the unique abilities of trial court judges and juries to assess credibility, the rule provides a bright line for both district courts and the PTO to follow in addressing the difficult issues related to invention dates.").

Sufficiency of corroboration is determined by using a "rule of reason" analysis, under which all pertinent evidence is examined when determining the credibility of an inventor's testimony. See *Price v. Symsek*, 988 F.2d 1187, 1195 (Fed. Cir. 1993) ("A rule of reason analysis is applied to determine whether the inventor's prior conception testimony has been corroborated."); *Berges v. Gottstein*, 618 F.2d 771, 776 (CCPA 1980) ("In the final analysis, each corroboration case must be decided on its own facts with a view to deciding whether the evidence as a whole is persuasive.").

The requirement of independent knowledge [\*34] remains key to the corroboration inquiry. See *Reese v. Hurst*, 661 F.2d 1222, 1225 (CCPA 1981) ("Adoption of the 'rule of reason' has not altered the [\*1171] requirement that evidence of corroboration must not depend solely on the inventor himself."). "Independent corroboration may consist of testimony of a witness, other than the inventor, to the actual reduction to practice or it may consist of evidence of surrounding facts and circumstances independent of information received from the inventor." *Id.* One consequence of the independence requirement is that testimony of one co-inventor cannot

be used to help corroborate the testimony of another. See, e.g., *Lacks Indus. v. McKechnie Vehicle Components USA, Inc.*, 322 F.3d 1335, 1350 (Fed. Cir. 2003) (opining that the Special Master rightly refused to accept cross-corroboration of oral testimony as being adequate).

Despite the importance of the independence requirement, however, "the law does not impose an impossible standard of 'independence' on corroborative evidence by requiring that every point of a reduction to practice be corroborated by evidence having a source totally independent of the inventor. [\*\*35] . . ." *Cooper v. Goldfarb*, 154 F.3d at 1330 (internal quotations omitted). Similarly, "it is not necessary to produce an actual over-the-shoulder observer. Rather, sufficient circumstantial evidence of an independent nature can satisfy the corroboration requirement." Id.

When an inventor claims a process for making a chemical compound rather than the compound itself, it is the successful reduction to practice of the process that must be corroborated, and not merely the successful production of the compound *per se*. Thus, spectral evidence that might be sufficient *per se* to corroborate a claim directed to the product will generally not be sufficient to corroborate a claim directed to the process, in the absence of some evidence to corroborate that the product was produced via that process.

## 2. Standard of Review

Whether or not corroboration exists is a question of fact, the district court's determination of which we review for clear error. This is true because "issues of conception and reduction to practice are questions of law predicated on subsidiary factual findings," *Eaton v. Evans*, 204 F.3d 1094, 1097 (Fed. Cir. 2000), and corroboration [\*\*36] is properly viewed as a subsidiary factual finding. See *Singh v. Brake*, 222 F.3d at 1368 (implying that corroboration is a question of fact by holding that "substantial evidence supports the Board's finding that this notebook entry alone was insufficient to corroborate Singh's testimony . . .").(emphasis added).

Before reviewing the determination of the court below, we note that it is true that corroboration is fundamentally about "credibility," see *supra* Discussion, Part C.1, and that in reviewing factual findings under the clear error standard, this court "gives great deference to the district court's decisions regarding credibility of witnesses." See *Ecocolchem, Inc. v. S. Cal. Edison Co.*,

227 F.3d 1361, 1378-79 (Fed. Cir. 2000) (internal quotations omitted). Indeed, such deference is appropriately accorded to assessments of witness credibility because "only the trial judge can be aware of the variations in demeanor and tone of voice that bear so heavily on the listener's understanding of and belief in what is said." *Anderson v. Bessemer City*, 470 U.S. 564, 575, 105 S. Ct. 1504, 84 L. Ed. 2d 518 (1985).

Nonetheless, such deference is often [\*\*37] of little consequence in a corroboration inquiry because the *raison d'être* of the corroboration requirement is our refusal to base priority determinations on a court's uncorroborated assessments of a testifying inventor's credibility. Even the most credible inventor testimony is a *a fortiori* required to be corroborated by independent [\*\*1172] evidence, which may consist of documentary evidence as well as the testimony of non-inventors. To the extent that a district court's finding of corroboration rests on its assessment of the credibility of non-inventor testimony, we apply the deferential standard of review stated in *Ecocolchem*. To the extent that it rests, as it does here, on the district court's assessment of documentary, as opposed to testimonial evidence, we still apply clear error review; however, clear error is less difficult to establish.

## 3. Analysis

The parties in this case dispute whether or not there was adequate corroboration of the inventors' testimony that Medichem had actually reduced to practice the process of the claimed invention before Rolabo's effective filing date. Medichem put forward two principal types of corroborating evidence: documentary evidence generated [\*\*38] by inventors and that generated by non-inventors.<sup>9</sup>

9 This patent bore a number of co-inventors, many of whom testified at trial. As we have noted above, the testimony of one inventor cannot be corroborated by the testimony of co-inventors.

In the first category, it produced a documented request for the analysis of a sample, purported to have been produced via the claimed synthetic route, which was sent by one co-inventor to another. Also in this category were the NMR spectral data obtained by the co-inventor pursuant to that request. These spectra were consistent with loratadine, and the accuracy of that chemical identification is not being challenged. Finally, this category includes the original laboratory notebook of

co-inventor Dr. Rodriguez. In the second category, documentary evidence by non-inventors, there is the original laboratory notebook of former Medichem employee, and non-inventor, Lola Casas.

This court now turns to consider the corroborative value of the three principal pieces of potentially corroborative evidence: the NMR spectra, the notebooks of Medichem's inventors, and the notebook of non-inventor Casas. We note at the outset that the [\*39] problem with the dated NMR data is that at most they corroborate that the inventors were in possession of the chemical loratadine as of that date; they do not, in themselves, adequately corroborate the claimed process, as they do not establish whether the sample that was analyzed was actually produced by that process. If this case dealt with a claim to a composition of matter, rather than to a process, the NMR evidence might very well take on a different relevance in this regard. As far as the corroborative value of the inventors' notebooks is concerned, they were not witnessed, and they do not provide an "independent" source of authority on the issue of reduction to practice. Hence, they have minimum corroborative value.

It is clear to this court, therefore, that Medichem's claim of corroboration stands or falls with the modicum of additional corroborative value that can properly be assigned to non-inventor Casas' notebook.<sup>10</sup> However, Casas did not testify [\*1173] regarding the notebook or the genuineness of its contents. In addition, although Casas' notebook was dated, it was neither signed nor witnessed, and inventor Rodriguez testified that she and Casas had made entries in each [\*40] others' notebooks. Rodriguez characterized these occasions as not out of the ordinary. As a result, the district court was clearly reliant on the inventor to help to identify the author of specific entries made in Casas' notebook, because in a reduction to practice inquiry, only those passages of the unsigned, unwitnessed notebooks authored by non-inventor Casas could possess significant corroborative value. In addition, without testimony from Casas, the court lacked any non-inventor testimony regarding the genuineness of the notebook's contents.

10 When an inventor attempts to offer into evidence the notebook of a non-inventor as evidence of corroboration, evidentiary issues might be implicated. For example, the notebook is likely to be hearsay, and if so, there may be an

issue as to whether or not it falls within an exception to the hearsay rule, such as the business record exception. Indeed, in *Chen v. Bouchard*, this court affirmed the decision of the Board of Patent Appeals and Interferences to exclude as inadmissible hearsay a non-inventor's notebooks, which had been offered to corroborate reduction to practice where, as in the instant case, the non-inventor did not testify. *347 F.3d 1299, 1308 (Fed. Cir. 2003)*.

[\*\*41] We also note that Medichem admitted fraudulently backdating certain documents relating to a purported 1995 reduction to practice. Even though the backdating of the 1995 documents was unrelated to the critical pages in Casas' notebook, which purport to establish a reduction to practice in 1996, the district court found that the credibility of the Medichem inventors was accordingly diminished.

Where a laboratory notebook authored by a non-inventor is offered into evidence pursuant to authentication by an inventor, where the author of the notebook has not testified at trial or otherwise attested to its authenticity, and where the notebook has not been signed or witnessed and has not been maintained in reasonable accordance with good laboratory practices sufficient to reasonably ensure its genuineness under the circumstances, then the corroborative value of the notebook is minimal. Given the facts of this case, Casas' notebook should therefore not be accorded much corroborative value. In view of the minimal corroborative value of the inventors' notebooks and the limited value of the NMR spectrum, we conclude that the evidence, evaluated as a whole under the rule of reason, is [\*42] insufficient as a matter of law to corroborate Medichem's reduction to practice.

The district court did not specifically address corroboration in its obviousness inquiry, a fact that might, in some circumstances, hamper our ability to conduct clear error review. Here, however, the facts of the case admit of only one conclusion as a matter of law, and we therefore decide the case without remanding to the district court for an explanation of why it implicitly found corroboration to be present. We hold that corroboration is absent and that the district court therefore erred in reaching its legal conclusion that Medichem had reduced its invention to practice in the spring of 1996. Accordingly, we reverse the district

437 F.3d 1157, \*1173; 2006 U.S. App. LEXIS 2653, \*\*42;  
77 U.S.P.Q.2D (BNA) 1865

court's award of priority to Medichem.

No costs.

AFFIRMED-IN-PART, REVERSED-IN-PART

LEXSEE 425 U.S. 273

SAKRAIDA v. AG PRO, INC.

No. 75-110

SUPREME COURT OF THE UNITED STATES

425 U.S. 273; 96 S. Ct. 1532; 47 L. Ed. 2d 784; 1976 U.S. LEXIS 146; 189 U.S.P.Q. (BNA) 449

Argued March 3, 1976  
April 20, 1976

**PRIOR HISTORY:** CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT

**SUMMARY:**

An action was instituted in the United States District Court for the Western District of Texas for alleged infringement of the plaintiff's combination patent covering a water flush system to remove cow manure from the floor of a dairy barn. All of the individual elements of the combination patent were old in the dairy business, and the only claimed inventive feature was the provision for abrupt release of water from storage tanks or pools directly onto the barn floor to cause the flow of a sheet of water washing all animal waste into drains within minutes without supplemental hand labor as was required under the prior art. After the District Court's initial grant of summary judgment for the defendant had been reversed by the *United States Court of Appeals for the Fifth Circuit* (437 F2d 99), the District Court, upon trial on remand, entered judgment for the defendant on the ground that the patent was invalid for obviousness under 103 of the Patent Act (35 USCS 103), which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the applicable art. The Court of Appeals again reversed and held the patent valid (474 F2d 167), and on rehearing, remanded the case for entry of a judgment holding the patent valid, unless the defendant established a case for a new trial on the basis of newly discovered evidence (481 F2d 668). The District Court ordered a new trial, but the Court of Appeals again reversed, reaffirming its prior

determination of patent validity and holding that the record did not support the grant of a new trial (512 F2d 141).

On certiorari, the United States Supreme Court reversed. In an opinion by Brennan, J., expressing the unanimous view of the court, it was held that the plaintiff's patent was invalid for obviousness under 103 of the Patent Act, since all of the individual elements of the patent were old in the dairy business and the combination of the old elements to produce an abrupt release of water directly onto the barn floor did not result in a new or different function or an effect greater than the sum of the several effects taken separately, the combination of old elements thus falling under the head of the work of a skillful mechanic, not that of an inventor.

**LAWYERS' EDITION HEADNOTES:**

[\*\*\*LEdHN1]

PATENTS §40

validity -- dairy barn flush system -- obviousness --

Headnote:[1A][1B][1C][1D]

A combination patent covering a water flush system to remove cow manure from the floor of a dairy barn--the only claimed inventive feature being the provision for abrupt release of water from storage tanks or pools directly onto the barn floor to cause the flow of a sheet of water washing animal waste into drains within minutes without supplemental hand labor as was required under prior art--is invalid for obviousness under 103 of the Patent Act (35 USCS 103) even though it produces a

425 U.S. 273, \*, 96 S. Ct. 1532, \*\*;  
47 L. Ed. 2d 784. \*\*\*LEdHN1; 1976 U.S. LEXIS 146

desired result in a more convenient, cheaper, and faster way than under the prior art, and even though it enjoys commercial success, where (1) all of the individual elements of the combination were old in the dairy business, and (2) the combination of the old elements to produce an abrupt release of water directly onto the barn floor did not result in a new or different function or an effect greater than the sum of the several effects taken separately, and fell under the head of the work of a skillful mechanic, not that of an inventor.

[\*\*\*LEdHN2]

PATENTS §17

necessity for invention -- mechanical skill --

Headnote:[2]

The Constitution requires that there be some "invention" to be entitled to patent protection; unless more ingenuity and skill are required than are possessed by an ordinary mechanic acquainted with the business, there is an absence of that degree of skill and ingenuity which constitute essential elements of every invention.

[\*\*\*LEdHN3]

PATENTS §19.1

TRIAL §154

patent validity -- obviousness --

Headnote:[3]

The ultimate test of patent validity is one of law, but resolution of the issue of obviousness under 103 of the Patent Act (*35 USC§ 103*)--which provides that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the applicable art--necessarily entails basic factual inquiries to determine (1) the scope and content of the prior art, (2) the differences between the prior art and the claims at issue, and (3) the level of ordinary skill in the pertinent art.

[\*\*\*LEdHN4]

EVIDENCE §1002

sufficiency -- patent --

Headnote:[4]

In an action for alleged infringement of a combination patent covering a water flush system to remove cow manure from the floor of a dairy barn, the evidence is sufficient to support the Federal District Court's finding that each of the component parts of the patent were old and well-known throughout the dairy industry prior to the date of the filing of the application for the patent in question, where the scope of the prior art is shown by prior patents, prior art publications, affidavits of people having knowledge of prior flush systems analogous to the patent in question, and the testimony of a dairy operator with 22 years experience who described flush systems he had seen on visits to dairy farms throughout the country.

[\*\*\*LEdHN5]

PATENTS §40

aggregation of old elements --

Headnote:[5]

Courts should scrutinize combination patent claims with a care proportioned to the difficulty and improbability of finding invention in an assembly of old elements.

[\*\*\*LEdHN6]

PATENTS §40

aggregation of old elements --

Headnote:[6]

A combination arranging old elements with each performing the same function it had been known to perform, although perhaps producing a more striking result than in previous combinations, is not patentable under standards appropriate for a combination patent.

[\*\*\*LEdHN7]

PATENTS §17

necessity of invention -- commercial success --

Headnote:[7]

Benefits in producing a desired result in a more

425 U.S. 273, \*, 96 S. Ct. 1532, \*\*,  
47 L. Ed. 2d 784, \*\*\*; 1976 U.S. LEXIS 146

convenient, cheaper, and faster way than under the prior art, and commercial success, will not, without invention, make patentability.

## SYLLABUS

Respondent's patent covering a water flush system to remove cow manure from the floor of a dairy barn *held* invalid for obviousness, it being a combination patent all the elements of which are old in the dairy business and were well known before the filing of the patent application. The system's exploitation of the principle of gravity to effect the abrupt release of water "did not produce a 'new or different function'... within the test of validity of combination patents." *Anderson's-Black Rock v. Pavement Co.*, 396 U.S. 57, 60. Pp. 274-283. I

512 F. 2d 141, reversed.

BRENNAN, J., delivered the opinion for a unanimous Court.

**COUNSEL:** *Stephen B. Tatem, Jr.*, argued the cause for petitioner. With him on the briefs was *James F. Hulse*.

*J. Pierre Kolisch* argued the cause for respondent. With him on the brief was *John W. Stuart*. \*

\* *Mary Helen Sears* filed a brief for the Texas Farmers Union as *amicus curiae* urging reversal.

*Helen W. Nies, Donald R. Durner, and David N. Webster* filed a brief for the Bar Association of the District of Columbia as *amicus curiae*.

**JUDGES:** BURGER, BRENNAN, STEWART, WHITE, MARSHALL, BLACKMUN, POWELL, REHNQUIST, and STEVENS.

## OPINION BY: BRENNAN

### OPINION

[\*273] [\*\*\*786] [\*\*1533] MR. JUSTICE BRENNAN delivered the opinion of the Court.

Respondent Ag Pro, Inc., filed this action against petitioner Sakraida on October 8, 1968, in the District Court for the Western District of [\*\*\*787] Texas for

infringement of United States Letters Patent 3,223,070, entitled "Dairy [\*274] Establishment," covering a water flush system to remove cow manure from the floor of a dairy barn. The patent was issued December 14, 1965, to Gribble and Bennett, who later assigned it to respondent.

[\*\*\*LEDHR1A] [1A]The District Court's initial grant of summary judgment for petitioner was reversed by the Court of Appeals for the Fifth Circuit. 437 F. 2d 99 (1971). After a trial on remand, the District Court again entered a judgment for petitioner. The District Court held that the patent "does not constitute invention, is not patentable, and is not a valid patent, it being a combination patent, all of the elements of which are old in the dairy business, long prior to 1963, and [\*\*1534] the combination of them as described in the said patent being neither new nor meeting the test of non-obviousness." The Court of Appeals again reversed and held the patent valid. 474 F. 2d 167 (1973). On rehearing, the court remanded "with directions to enter a judgment holding the patent valid, subject, however, to... consideration of a motion under Rule 60 (b)(2), F.R. Civ. P., to be filed in the District Court by the [petitioner] Sakraida on the issue of patent validity based on newly discovered evidence." 481 F. 2d 668, 669 (1973). The District Court granted the motion and ordered a new trial. The Court of Appeals again reversed, holding that the grant of the motion was error, because "the record on the motion establishes that [petitioner] failed to exercise due diligence to discover the new evidence prior to entry of the former judgment." 512 F. 2d 141, 142 (1975). The Court of Appeals further held that "[o]ur prior determination of patent validity is reaffirmed." *Id.*, at 144. We granted certiorari. 423 U.S. 591 (1975). We hold that the Court of Appeals erred in holding the patent valid and also in reaffirming its determination of patent validity. We therefore reverse and direct the reinstatement of the District [\*275] Court's judgment for petitioner, and thus we have no occasion to decide whether the Court of Appeals properly found that petitioner had not established a case for a new trial under Rule 60 (b)(2).

Systems using flowing water to clean animal wastes from barn floors have been familiar on dairy farms since ancient times.<sup>1</sup> The District Court found, and respondent concedes, that none of the 13 elements of the Dairy Establishment combination is new,<sup>2</sup> [\*\*\*788] and many of those [\*276] elements, including [\*1535] storage of the water in tanks or pools, appear in at least

425 U.S. 273, \*276; 96 S. Ct. 1532, \*\*1535;  
47 L. Ed. 2d 784, \*\*\*788; 1976 U.S. LEXIS 146

six prior patented systems.<sup>3</sup> The prior art involved spot delivery of water from tanks or pools [\*277] to the barn floor by means of high pressure hoses or pipes. That system required supplemental hand labor, using tractor blades, shovels, and brooms, and cleaning by these methods took several hours. The only claimed inventive feature of the Dairy Establishment combination of old elements is the provision for abrupt release of the water from the tanks or pools directly onto the barn floor, which causes the flow of a sheet of water that washes all animal waste into drains within minutes and requires no supplemental hand labor. As an expert witness for respondent testified concerning the effect of Dairy Establishment's combination: "[W]ater at the bottom has more friction than this water on the top and it keeps moving ahead and as this water keeps moving ahead we get a rolling action of this water which produced the cleaning action.... You do not get this in a hose.... [U]nless that water is continuously directed toward the cleaning area the cleaning action almost ceases instantaneously...."<sup>4</sup>

1 Among the labors of Hercules is the following:

"Heracles now set out to perform his fifth Labour, and this time his task was to cleanse the stables of Augeas in a single day. Augeas was a rich king of Elis, who had three thousand cattle. At night the cattle always stood in a great court surrounded with walls, close to the king's palace, and as it was quite ten years since the servants had cleaned it out, there was enough refuse in the court to build up a high mountain. Heracles went to Augeas and asked if he would give him the tenth part of his flocks if he thoroughly cleansed his stables in a single day. The king looked upon this as such an absolutely impossible feat that he would not have minded promising his kingdom as a reward for it, so he laughed and said, 'Set to work, we shall not quarrel about the wages,' and he further promised distinctly to give Heracles what he asked, and this he did in the presence of Phyleus, his eldest son, who happened to be there. The next morning Heracles set to work, but even his strong arms would have failed to accomplish the task if they had not been aided by his mother-wit. He compelled a mighty torrent to work for him, but you would hardly guess how he did it. First he opened great gates on two opposite sides of the court, and then he went to the stream,

and when he had blocked up its regular course with great stones, he conducted it to the court that required to be cleansed, so that the water streamed in at one end and streamed out at the other, carrying away all the dirt with it. Before evening the stream had done its work and was restored to its usual course." C. Witt, *Classic Mythology* 119-120 (1883).

2 The District Court found as follows respecting Claims 1 and 3, the only claims involved in the case:

"1. I find that the 'dairy establishment' as described in United States Letters Patent 3,223,070 is composed of 13 separate items, as follows:

"(a) ... a smooth, evenly contoured, paved surface forming a floor providing a walking surface....'

"(b) ... drain means for draining wash water from such floor opening to the top of the floor.'

"(c) ... said smooth, evenly contoured surface which forms such floor sloping toward said drain....'

"(d) ... multiple rest areas with individual stalls for each cow and with each of said stalls having a bottom which is also a smooth pavement....'

"(e) ... which is disposed at an elevation above the paved surface forming the floor....'

"(f) ... said stalls being dimensioned so that a cow can comfortably stand or lie in the stall, but offal from the cow falls outside the stall bottom and onto the floor providing the walking surface in the barn....'

"(g) ... said barn further including defined feeding areas having feeding troughs....'

"(h) ... a cow-holding area.'

"(i) ... a milking area.'

425 U.S. 273, \*277; 96 S. Ct. 1532, \*\*1535;  
47 L. Ed. 2d 784, \*\*\*788; 1976 U.S. LEXIS 146

"(j) ... a transfer area all bottomed with the walking surface forming said floor in the barn....'

"(k) ... and floor washing means for washing the floor providing the walking surface in the barn where said floor bottom, said feeding, holding, milking and transfer areas operable to send wash water flowing over the floor with such water washing any cow offal thereon into the said drain means, said floor washing means including means located over a region of said floor which is uphill from said drain means constructed to collect water as a pool above said floor and operable after such collection of water as a pool to dispense the water as a sheet of water over said floor.'

"(l) A tank on a mounting, so that it can be tilted, and the water poured out to cascade on the floor to form a sheet.

"(m) A floor-washing means comprising a dam for damming or collecting water as a pool directly on the floor, which such dam abruptly openable to send water cascading as a sheet over the floor towards the drain.

"2. I further find that each of the items above-described were not new, but had been used in the dairy business prior to the time the application for the said Gribble patent, made the subject of this action, had been filed in the Patent Office of the United States on November 5, 1963."

3 The District Court found:

"Many of the items going to make up Plaintiff's claim for a patent were disclosed in prior patents, known respectively as the McCormack patent, the Holz patent, the Ingraham patent, the Kreutzer patent, the Bogert patent, and the Luks patent; and that the statements of the Examiner's opinions refusing to issue a patent are true as to all items there stated to be covered in prior patents or publications."

4 This witness further testified:

"[W]ater has energy and it can be used in many different ways. In a hose the energy is used

by impact, under pressure, external force that is applied to this pressure - to this water, whereas the water that comes down as a sheet or wall of water has built in energy because of its elevation and as this water is released it does the same thing water does in a flooded stream. As this water - I will try to make this clear, and I hope I can, on the surface of this pavement there are these piles of manure droppings. This pavement is smooth and this water moves down over this manure. The water at the bottom has more friction than this water on the top and it keeps moving ahead and as this water keeps moving ahead we get a rolling action of this water which produced the cleaning action. That is the key to this method of cleaning. You do not get this in a hose. You do not get it in a gutter as has been used in the past. I might just mention a little bit about the hose. This squirting water on a floor - probably have done it on our own side-walks or walkways, and I just mention that, that unless that water is continuously directed towards the cleaning area the cleaning action almost ceases instantaneously. Now the movie that was shown earlier very dramatically illustrated that point. The cleaning action - as soon as the hoses moved to one side the cleaning action ceased here and that is why this hose was moved back and forth, to drive this stuff on down to where we want it."

[\*278] [\*\*\*789] The District Court found that "[n]either the tank which holds the water, nor the means of releasing the water quickly is new, but embrace[s] tanks and doors which have long been known," and further that "their use in this connection is one that is obvious, and the patent in that respect is lacking in novelty. The patent does not meet the non-obvious requirements of the law." The District Court therefore held that Dairy Establishment "may be relevant" [\*\*1536] to commercial success, but not to invention," because the combination "was reasonably obvious to one with ordinary skill in the art." Moreover, even if the combination filled a "long-felt want and... has enjoyed commercial success, those matters, without invention, will not make patentability." Finally, the District Court concluded: "[T]o those skilled in the art, the use of the old elements in combination was not an invention by the obvious-nonobvious standard. Even [\*279] though the dairy barn in question attains the posture of a successful venture, more than that is needed for invention." <sup>5</sup> The

425 U.S. 273, \*279; 96 S. Ct. 1532, \*\*1536,  
47 L. Ed. 2d 784, \*\*\*789; 1976 U.S. LEXIS 146

Court of Appeals disagreed with the District Court's conclusion on the crucial issue of obviousness.

5 The court also concluded that "while the combination of old elements may have performed a useful function, it added nothing to the nature and quality of dairy barns theretofore used."

[\*\*\*LEdHR2] [2]It has long been clear that the Constitution requires that there be some "invention" to be entitled to patent protection. *Dann v. Johnston, ante*, p. 219. As we explained in *Hotchkiss v. Greenwood, 11 How. 248, 267 (1851)*: "[U]nless more ingenuity and skill... were required... than were possessed by an ordinary mechanic acquainted with the business, there was an absence of that degree of skill and ingenuity which constitute essential elements of every invention. In other words, the improvement is the work of the skillful mechanic, not that of the inventor." This standard was enacted in 1952 by Congress in 35 U.S.C. § 103 "as a codification of judicial precedents... with congressional directions that inquiries into the obviousness of the subject matter sought to be patented are a prerequisite to patentability." *Graham v. John Deere Co.*, 353 U.S. 1, 17 (1966). Section 103 provides: S

"A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject [\*\*\*790] matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made."I

[\*280] [\*\*\*LEdHR3] [3]The ultimate test of patent validity is one of law, *Great A. & P. Tea Co. v. Supermarket Corp.*, 340 U.S. 147, 155 (1950), but resolution of the obviousness issue necessarily entails several basic factual inquiries, *Graham v. John Deere Co.*, *supra*, at 17. S

"Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved." *Ibid*I

[\*\*\*LEdHR1B] [1B]The Court of Appeals concluded that "the facts presented at trial clearly do not support [the District Court's] finding of obviousness under the three-pronged *Graham* test..." 474 F. 2d, at 172. We disagree and hold that the Court of Appeals erroneously set aside the District Court's findings.

[\*\*\*LEdHR4] [4] [\*\*\*LEdHR5] [5]The scope of the prior art was shown by prior patents, prior art publications, affidavits of people having knowledge of prior flush systems analogous to respondent's, and the testimony of a dairy operator with 22 years of experience who described flush systems he had seen on visits to dairy farms throughout the country. Our independent examination of that evidence persuades us of its sufficiency to support the District Court's finding "as a fact that each and all of the component parts of this patent... were old and well-known throughout the dairy industry long prior to the date of the filing of the application for the Gribble patent... What Mr. Gribble referred to... as the essence of the [\*\*1537] patent, to-wit, the manure flush system, was old, various means for flushing manure from dairy barns having been used long before the filing of the application..."<sup>6</sup> Indeed, [\*281] respondent admitted at trial "that the patent is made up of a combination of old elements" and "that all elements are individually old..." Accordingly, the District Court properly followed our admonition in *Great A. & P. Tea Co. v. Supermarket Corp.*, *supra*, at 152: "Courts should scrutinize combination patent claims with a care proportioned to the difficulty and improbability of finding invention in an assembly of old elements...." [\*\*\*791] A patent for a combination which only unites old elements with no change in their respective functions... obviously withdraws what already is known into the field of its monopoly and diminishes the resources available to skillful men...."

6 The court stated:

"I therefore find as a fact that each and all of the component parts of this patent as listed under the applicant's claims set out in said patent, were old and well-known throughout the dairy industry long prior to the date of the filing of the application for the Gribble patent. I further find that what Mr. Gribble referred to in his deposition as the essence of the patent, to-wit, the manure flush system, was old, various means for flushing manure from dairy barns having been used long

425 U.S. 273, \*281; 96 S. Ct. 1532, \*\*1537;  
47 L. Ed. 2d 784, \*\*\*791; 1976 U.S. LEXIS 146

before the filing of the application for the Gribble patent, the general idea in that connection being a hard surfaced sloping floor onto which the cows' offal was dropped, and some system of introducing water in sufficient quantities and force onto said floor to wash the offal therefrom, with a ditch or drain to carry the offal so washed away from the barn, either into a manure container or otherwise."

The Court of Appeals recognized that the patent combined old elements for applying water to a conventional sloped floor in a dairy barn equipped with drains at the bottom of the slope and that the purpose of the storage tank - to accumulate a large volume of water capable of being released in a cascade or surge - was equally conventional. *474 F. 2d, at 169*. It concluded, however, that the element lacking in the prior art was any evidence of an arrangement of the old elements to effect the abrupt release of a flow of water to wash animal wastes from the floor of a dairy barn. *Ibid*. Therefore, [\*282] "although the [respondent's] flush system does not embrace a complicated technical improvement, it does achieve a synergistic result through a novel combination." *Id. at 173*.

[\*\*\*LEdHR1C] [1C] [\*\*\*LEdHR6] [6]We cannot agree that the combination of these old elements to produce an abrupt release of water directly on the barn floor from storage tanks or pools can properly be characterized as synergistic, that is, "result[ing] in an effect greater than the sum of the several effects taken separately." *Anderson's-Black Rock v. Pavement Co.*, 396 U.S. 57, 61 (1969). Rather, this patent simply arranges old elements with each performing the same function had been known to perform, although perhaps producing a more striking result than in previous combinations. Such combinations are not patentable under standards appropriate for a combination patent. *Great A. & P. Tea Co. v. Supermarket Corp.*, *supra*; *Anderson's-Black Rock v. Pavement Co.*, *supra*. Under those authorities this assembly of old elements that delivers water directly rather than through pipes or hoses to the barn floor falls under the head of "the work of the skillful mechanic, not that of the inventor." *Hotchkiss v. Greenwood*, 11 How,

*at 267*. Exploitation of the principle of gravity adds nothing to the sum of useful knowledge where there is no change in the respective functions of the elements of the combination; this particular use of the assembly of old elements would be obvious to any person skilled in the art of mechanical application. See *Dann v. Johnston, ante*, at 229-230.

[\*\*\*LEdHR1D] [1D] [\*\*\*LEdHR7] [7]Though doubtless a matter of great convenience, producing a desired result in a cheaper and faster way, and enjoying commercial success, Dairy Establishment "did not produce a 'new or different' [\*\*1538] function... within the test of validity of combination patents." *Anderson's-Black Rock v. Pavement Co.*, *Supra*, *at 60*. These [\*283] desirable benefits "without invention will not make patentability." *Great A. & P. Tea Co. v. Supermarket Corp.*, 340 U.S., *at 153*. See *Dann v. Johnston, ante*, at 230 n. 4.

*Reversed*

## REFERENCES

60 Am Jur 2d, Patents 53- 86

19 Am Jur Pl & Pr Forms (Rev ed), Patents, Forms 11-22

14 Am Jur Legal Forms 2d, Patents 196.1 et seq.

35 USCS 103

US L Ed Digest, Patents 19.1, 40

ALR Digests, Patents 7, 9

L Ed Index to Annos, Patents

ALR Quick Index, Patents

Federal Quick Index, Patents

## Annotation References:

Application and effect of 35 USCS 103, requiring nonobvious subject matter, in determining validity of patents. 23 ALR Fed 326.

LEXSEE 383 U.S. 39

UNITED STATES v. ADAMS ET AL.

No. 55

SUPREME COURT OF THE UNITED STATES

383 U.S. 39; 86 S. Ct. 708; 15 L. Ed. 2d 572; 1966 U.S. LEXIS 2754; 148 U.S.P.Q. (BNA) 479

October 14, 1965, Argued  
February 21, 1966, Decided

**PRIOR HISTORY:** CERTIORARI TO THE  
UNITED STATES COURT OF CLAIMS.

**DISPOSITION:** 165 Ct. Cl. 576, 330 F.2d 622,  
affirmed.

**SUMMARY:**

Persons having an interest in a patent on a nonrechargeable electrical battery using magnesium and cuprous chloride electrodes in a water electrolyte sued the United States in the United States Court of Claims for infringement and breach of an implied contract to pay compensation for use of the invention. The Court of Claims held the patent valid and infringed (165 Ct Cl 576, 330 F2d 622), and about 6 months later, on a motion to amend the judgment, it held that no contract had been established.

On certiorari to review only the patent-validity issue, the Supreme Court of the United States affirmed. In an opinion by Clark, J., expressing the views of seven members of the Court, it was held that (1) the 90-day period for filing the petition for certiorari began with the date of decision on the contract issue, and (2) the invention was both novel and nonobvious.

White, J., dissented without opinion.

Fortas, J., did not participate.

**LAWYERS' EDITION HEADNOTES:**

[\*\*\*LEdHN1]

ERROR §882(2)

time for filing petition for certiorari --

Headnote:[1]

In a suit against the United States in the Court of Claims for patent infringement and breach of an implied contract to pay compensation for the use of the invention, in which the trial commissioner held that the patent was valid and infringed in part but that no contract had been established, the Court of Claims adopted these findings but initially reached only the patent questions and decided the contract claims on a timely motion to amend the judgment, the 90-day period for filing a petition of certiorari with the Supreme Court begins with the date of decision on the contract issue, since the Government's liability is inextricably linked with the alleged contract action which was not determined until the latter judgment.

[\*\*\*LEdHN2]

ERROR §882(2)

time for filing petition for certiorari --

Headnote:[2A][2B]

The 90-day period for filing a petition for certiorari with the Supreme Court runs from the date of the order overruling a timely motion to amend the judgment.

[\*\*\*LEdHN3]

ERROR §963

certiorari -- service --

383 U.S. 39, \*, 86 S. Ct. 708, \*\*,  
15 L. Ed. 2d 572, \*\*\*LEdHN3; 1966 U.S. LEXIS 2754

Headnote:[3]

There is no merit in a contention that on a petition for certiorari the United States failed to comply with *Supreme Court Rules 21(1)* and 33 as to service, since the requirement is not jurisdictional, no prejudice resulted, and the failure was inadvertent.

[\*\*\*LEdHN4]

PATENTS §18

patentability --

Headnote:[4]

Novelty and nonobviousness, as well as utility, are separate tests of patentability and all must be satisfied in a valid patent.

[\*\*\*LEdHN5]

PATENTS §123

claims -- construction with specifications --

Headnote:[5]

While the claims of a patent limit the invention, and specifications cannot be used to expand the patent monopoly, the claims are to be construed in the light of the specifications, and both are to be read with a view to ascertaining the invention.

[\*\*\*LEdHN6]

PATENTS §69

novelty -- battery --

Headnote:[6]

A nonrechargeable electrical battery consisting of a magnesium electrode, a cuprous chloride electrode, and an electrolyte of either plain or salt water, is novel where a previous foreign patent claiming magnesium as an electrode specified an acid electrolyte and was both dangerous and inoperable.

[\*\*\*LEdHN7]

PATENTS §60

novelty -- previous unsuccessful invention --

Headnote:[7]

An inoperable invention or one which fails to achieve its intended result does not negative novelty, even though a foreign patent has been issued on it.

[\*\*\*LEdHN8]

PATENTS §27

patentability -- equivalence --

Headnote:[8]

There is no equivalency negating the patentability of a nonrechargeable electrical battery using magnesium and cuprous chloride electrodes on the ground that such electrodes were merely equivalent substitutions for zinc and silver chloride electrodes where the operating characteristics were different and therefore nonequivalent and the previous batteries were of a completely different type.

[\*\*\*LEdHN9]

PATENTS §19.1

nonobviousness -- combining known elements --

Headnote:[9]

A nonrechargeable electrical battery consisting of a magnesium electrode, a cuprous chloride electrode, and an electrolyte of plain or salt water, is nonobvious where its operating characteristics were unexpected and surpassed existing wet batteries, and to combine the elements known to the prior art, a person reasonably skilled in the prior art must ignore that batteries continuing to operate on an open circuit and which heated in normal use were not practical and that water-activated batteries were successful only when combined with electrolytes detrimental to the use of magnesium.

[\*\*\*LEdHN10]

PATENTS §19.1

nonobviousness -- disadvantages in old devices --

Headnote:[10]

While one who merely finds new uses for old inventions by shutting his eyes to their prior

383 U.S. 39, \*; 86 S. Ct. 708, \*\*;  
15 L. Ed. 2d 572, \*\*\*LEdHN10; 1966 U.S. LEXIS 2754

disadvantages does not thereby discover a patentable innovation, known disadvantages in old devices which would naturally discourage the search for new inventions may be taken into account in determining nonobviousness.

[\*\*\*LEdHN11]

#### PATENTS §19.1

##### obviousness -- factors --

Headnote:[11]

As bearing on the question of the obviousness of an invention, the court may consider that noted experts expressed disbelief in the invention, that several of the same experts subsequently recognized the significance of the invention and some even patented improvements on the same system, that in a crowded art replete with a century and a half of advancement the Patent Office found not one reference to cite against the invention, and that as against the subsequently issued improvement patents, the Patent Office found but three references prior to the invention in question, none of which was relied on against it.

#### SYLLABUS

Respondents sued the Government under 28 U. S. C. § 1498 charging infringement and breach of contract to compensate for use of a wet battery on which a patent had been issued to respondent Adams. The battery consisted of a magnesium electrode (anode) and a cuprous chloride electrode (cathode) placed in a container with water to be supplied as the electrolyte, providing a constant voltage and current without the use of acids. Despite initial disbelief in the battery's efficacy by government experts to whose attention Adams brought his invention the Government ultimately (but without notifying Adams) put the battery to many uses. In opposition to respondents' suit the Government claimed the device unpatentable because the use of magnesium and cuprous chloride to perform the function shown by Adams had been previously well known in the art and their combination represented no significant change compared to the prior art wet battery designs such as those using a zinc anode and silver chloride cathode for which magnesium and cuprous chloride were known substitutes. The Court of Claims adopted the Trial Commissioner's finding that the patent was valid and

infringed by some of the accused devices. Six months later, following respondents' motion to amend the judgment, that court found no breach of contract. More than 90 days after the initial judgment but less than that period after the contract decision, the Government sought a time extension for review as to the issue of patent validity. Such review was later granted though service on respondents of the petition for writ of certiorari was delayed beyond the time prescribed by this Court's rules. Held:

1. The petition for certiorari was timely, since the 90-day filing period commenced, not with the initial judgment, but with the judgment on the contract issue; nor did failure to comply with the Court's rules as to service of the petition bar this review since the service requirements therein are not jurisdictional, and no prejudice resulted from the Government's inadvertent failure to meet those requirements. Pp. 41-42.

2. The Adams patent is valid since it satisfied the separate tests of novelty, nonobviousness, and utility required for issuance of a patent. *Graham v. John Deere Co.*, *ante*, p. 1. Pp. 48-52.

3. The Adams battery was novel. Pp. 48-51.

(a) The fact that it was water-activated set it apart from the prior art. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, distinguished. Pp. 48-50.

(b) The combination of magnesium and cuprous chloride was novel in the light of the prior art. P. 50.

(c) The use of magnesium for zinc and cuprous chloride for silver chloride did not involve merely equivalent substitutes, as is evidenced by the fact that the Adams battery had different operating characteristics from those of the batteries relied upon by the Government. Pp. 50-51.

4. The Adams battery was nonobvious. Pp. 51-52.

(a) Though each of the battery's elements was well known in the prior art, to combine them as Adams did required that a person reasonably skilled in that art ignore that open-circuit batteries which heated in normal use were not practical and that water-activated batteries were successful only when combined with electrolytes harmful to the use of magnesium. Pp. 51-52.

383 U.S. 39, \*; 86 S. Ct. 708, \*\*;  
15 L. Ed. 2d 572, \*\*\*; 1966 U.S. LEXIS 2754

(b) Noted experts had expressed initial disbelief in the Adams battery. P. 52.

(c) In a crowded art replete with a century and a half of advance the Patent Office could find no reference to cite against the Adams application. P. 52.

**COUNSEL:** Assistant Attorney General Douglas argued the cause for the United States. With him on the brief were Acting Solicitor General Spritzer, Sherman L. Cohn and Edward Berlin.

John A. Reilly argued the cause and filed a brief for respondents.

**JUDGES:** Warren, Harlan, Brennan, Black, Stewart, Clark, White, Douglas; Fortas took no part in the consideration or decision of this case.

#### OPINION BY: CLARK

#### OPINION

[\*40] [\*\*\*574] [\*\*709] MR. JUSTICE CLARK delivered the opinion of the Court.

This is a companion case to No. 11, *Graham v. John Deere Co.*, decided this day along with Nos. 37 and 43, *Calmair, Inc. v. Cook Chemical Co.* and *Colgate-Palmolive Co. v. Cook Chemical Co.* The United States seeks review of a judgment of the Court of Claims, holding valid and infringed a patent on a wet battery issued to [\*41] Adams. This suit under 28 U.S.C. § 1498 (1964 ed.) was brought by Adams and others holding an interest in the patent against the Government charging both infringement and breach of an implied contract to pay compensation for the use of the invention. The Government challenged the validity of the patent, denied that it had been infringed or that any contract for its use had ever existed. The Trial Commissioner held that the patent was valid and infringed in part but that no contract, express or implied, had been established. The Court of Claims adopted these findings, initially reaching only the patent questions, 165 Ct. Cl. 576, 330 F.2d 622, but subsequently, on respondents' motion to amend the judgment, deciding the contract claims as well. 165 Ct. Cl. at 598. The United States sought certiorari on the patent validity issue only. We granted the writ, along with the others, in order to settle the important issues of patentability presented by the four cases. 380 U.S. 949. We affirm.

#### I.

[\*\*\*LEDHR1] [1] [\*\*\*LEDHR2A] [2A] While this case is controlled on the merits by No. 11, *Graham, ante*, p. 1, respondents have raised threshold issues as to our jurisdiction which require separate handling. They say that the petition for certiorari came too late, contending that the 90-day period for filing began with the date of the initial judgment rather than the date of the decision on the contract issue, citing *F. T. C. v. Minneapolis-Honeywell Co.*, 344 U.S. 206 (1952). We cannot agree; first, because that case did not involve a timely motion to amend the judgment<sup>1</sup> and, secondly, because here the Government's liability was inextricably [\*42] linked with the alleged contract action which was not determined until the latter judgment.

[\*\*\*LEDHR2B] [2B]

1 Where a timely motion is filed, the time in such cases runs from the date of the order overruling the motion. See *Department of Banking v. Pink*, 317 U.S. 264, 267 (1942); *United States v. Crescent Amusement Co.*, 323 U.S. 173, 177 (1944); *Forman v. United States*, 361 U.S. 416, 426 (1960).

[\*\*\*LEDHR3] [3] Nor is there merit in respondents' contention that the Government failed to comply with the requirements of our Rules 21 (1) and 33 as to service, since these requirements are not jurisdictional, no [\*575] prejudice resulted and the failure was inadvertent.

We turn now to the merits.

#### II.

##### *The Patent in Issue and Its Background.*

The patent under consideration, U.S. No. 2,322,210, was issued in 1943 upon an application filed in December 1941 by Adams. It relates to a nonrechargeable, as opposed to a storage, electrical battery. Stated simply, the battery comprises two electrodes -- one made of magnesium, the other of cuprous chloride -- which are placed in a container. The electrolyte, or battery fluid, used may be either plain or salt water.

The specifications of the patent state that the object of the invention is to provide constant voltage and current

383 U.S. 39, \*42; 86 S. Ct. 708, \*\*709;  
15 L. Ed. 2d 572, \*\*\*575; 1966 U.S. LEXIS 2754

without the use of acids, conventionally employed in storage batteries, and without the generation of dangerous fumes. Another object is "to provide a battery which is relatively light in weight with respect to capacity" and which "may be [\*\*710] manufactured and distributed to the trade in a dry condition and rendered serviceable by merely filling the container with water." Following the specifications, which also set out a specific embodiment of the invention, there appear 11 claims. Of these, principal reliance has been placed upon Claims 1 and 10, which read:

"1. A battery comprising a liquid container, a magnesium electropositive electrode inside the container and having an exterior terminal, a fused cuprous chloride electronegative electrode, and a terminal connected with said electronegative electrode."

[\*43] "10. In a battery, the combination of a magnesium electropositive electrode, and an electronegative electrode comprising cuprous chloride fused with a carbon catalytic agent."

For several years prior to filing his application for the patent, Adams had worked in his home experimenting on the development of a wet battery. He found that when cuprous chloride and magnesium were used as electrodes in an electrolyte of either plain water or salt water an improved battery resulted.

The Adams invention was the first practical, water-activated, constant potential battery which could be fabricated and stored indefinitely without any fluid in its cells. It was activated within 30 minutes merely by adding water. Once activated, the battery continued to deliver electricity at a voltage which remained essentially constant regardless of the rate at which current was withdrawn. Furthermore, its capacity for generating current was exceptionally large in comparison to its size and weight. The battery was also quite efficient in that substantially its full capacity could be obtained over a wide range of currents. One disadvantage, however, was that once activated the battery could not be shut off; the chemical reactions in the battery continued even though current was not withdrawn. Nevertheless, these chemical reactions were highly exothermic, liberating large quantities of heat during operation. As a result, the battery performed with little effect on its voltage or current in very low temperatures. Relatively high temperatures would not damage the battery. Consequently, the battery was operable from 65 degrees

below zero Fahrenheit to 200 degrees Fahrenheit. See findings at 165 Ct. Cl., at 591-592, 330 F.2d, at 632.

[\*\*576] Less than a month after filing for his patent, Adams brought his discovery to the attention of the Army and Navy. Arrangements were quickly made for demonstrations [\*44] before the experts of the United States Army Signal Corps. The Signal Corps scientists who observed the demonstrations and who conducted further tests themselves did not believe the battery was workable. Almost a year later, in December 1942, Dr. George Vinal, an eminent government expert with the National Bureau of Standards, still expressed doubts. He felt that Adams was making "unusually large claims" for "high watt hour output per unit weight," and he found "far from convincing" the graphical data submitted by the inventor showing the battery's constant voltage and capacity characteristics. He recommended, "Until the inventor can present more convincing data about the performance of his [battery] cell, I see no reason to consider it further."

However, in November 1943, at the height of World War II, the Signal Corps concluded that the battery was feasible. The Government thereafter entered into contracts with various battery companies for its procurement. The battery was found adaptable to many uses. Indeed, by 1956 it was noted that "there can be no doubt that the addition of water activated batteries to the family of power sources has brought about developments which would otherwise have been technically [\*\*711] or economically impractical." See Tenth Annual Battery Research and Development Conference, Signal Corps Engineering Laboratories, Fort Monmouth, N. J., p. 25 (1956). Also, see Finding No. 24, 165 Ct. Cl., at 592, 330 F.2d, at 632.

Surprisingly, the Government did not notify Adams of its changed views nor of the use to which it was putting his device, despite his repeated requests. In 1955, upon examination of a battery produced for the Government by the Burgess Company, he first learned of the Government's action. His request for compensation was denied in 1960, resulting in this suit.

[\*45] III.

#### *The Prior Art.*

The basic idea of chemical generation of electricity is, of course, quite old. Batteries trace back to the epic

383 U.S. 39, \*45; 86 S. Ct. 708, \*\*711;  
15 L. Ed. 2d 572, \*\*\*576; 1966 U.S. LEXIS 2754

discovery by the Italian scientist Volta in 1795, who found that when two dissimilar metals are placed in an electrically conductive fluid an electromotive force is set up and electricity generated. Essentially, the basic elements of a chemical battery are a pair of electrodes of different electrochemical properties and an electrolyte which is either a liquid (in "wet" batteries) or a moist paste of various substances (in the so-called "dry-cell" batteries). Various materials which may be employed as electrodes, various electrolyte possibilities and many combinations of these elements have been the object of considerable experiment for almost 175 years. See generally, Vinal, Primary Batteries (New York 1950).

At trial, the Government introduced in evidence 24 patents and treatises as representing the art as it stood in 1938, the time of the Adams invention.<sup>2</sup> Here, however, the Government has relied primarily [\*\*\*577] upon only six of these references<sup>3</sup> which we may summarize as follows.

2 The references are listed in the opinion of the Court of Claims, 165 Ct. Cl., at 590, 330 F.2d, at 631.

3 Niaudet, Elementary Treatise on Electric Batteries (Fishback translation 1880); Hayes U.S. Patent No. 282,634 (1883); Wood U.S. Patent No. 1,696,873 (1928); Codd, Practical Primary Cells (London 1929); Wensky British Patent No. 49 of 1891; and Skrivanoff British Patent No. 4,341 (1880).

The Niaudet treatise describes the Marie Davy cell invented in 1860 and De La Rue's variations on it. The battery comprises a zinc anode and a silver chloride cathode. Although it seems to have been capable of working in an electrolyte of pure water, Niaudet says the battery was of "little interest" until De La Rue used a solution of ammonium chloride as an electrolyte. Niaudet also states that "the capital advantage of this battery, [\*46] as in all where zinc with sal ammoniac [ammonium chloride solution] is used, consists in the absence of any local or internal action as long as the electric circuit is open; in other words, this battery does not work upon itself." Hayes likewise discloses the De La Rue zinc-silver chloride cell, but with certain mechanical differences designed to restrict the battery from continuing to act upon itself.

The Wood patent is relied upon by the Government as teaching the substitution of magnesium, as in the

Adams patent, for zinc. Wood's patent, issued in 1928, states: "It would seem that a relatively high voltage primary cell would be obtained by using . . . magnesium as the . . . [positive] electrode and I am aware that attempts have been made to develop such a cell. As far as I am aware, however, these have all been unsuccessful, and it has been generally accepted that magnesium could not be commercially utilized as a primary cell electrode." Wood recognized that the difficulty with magnesium electrodes is their susceptibility to chemical corrosion by the action of acid or ammonium chloride electrolytes. Wood's solution to this problem was to use a [\*712] "neutral electrolyte containing a strong soluble oxidizing agent adapted to reduce the rate of corrosion of the magnesium electrode on open circuit." There is no indication of its use with cuprous chloride, nor was there any indication that a magnesium battery could be water-activated.

The Codd treatise is also cited as authority for the substitution of magnesium. However, Codd simply lists magnesium in an electromotive series table, a tabulation of electrochemical substances in descending order of their relative electropositivity. He also refers to magnesium in an example designed to show that various substances are more electropositive than others, but the discussion involves a cell containing an acid which would destroy magnesium within minutes. In short, Codd indicates, by inference, only that magnesium is a theoretically [\*47] desirable electrode by virtue of its highly electropositive character. He does not teach that magnesium could be combined in a water-activated battery or that a battery using magnesium would have the properties of the Adams device. Nor does he suggest, as the Government indicates, that cuprous chloride could be substituted for silver chloride. He merely refers to the cuprous ion -- a generic term which includes an infinite number of copper compounds -- and in no way suggests that cuprous chloride could be employed in a battery.

[\*\*\*578] The Government then cites the Wensky patent which was issued in Great Britain in 1891. The patent relates to the use of cuprous chloride as a depolarizing agent. The specifications of his patent disclose a battery comprising zinc and copper electrodes, the cuprous chloride being added as a salt in an electrolyte solution containing zinc chloride as well. While Wensky recognized that cuprous chloride could be used in a constant-current cell, there is no indication that he taught a water-activated system or that magnesium

383 U.S. 39, \*47; 86 S. Ct. 708, \*\*712;  
15 L. Ed. 2d 572, \*\*\*578; 1966 U.S. LEXIS 2754

could be incorporated in his battery.

Finally, the Skrivanoff patent depended upon by the Government relates to a battery designed to give intermittent, as opposed to continuous, service. While the patent claims magnesium as an electrode, it specifies that the electrolyte to be used in conjunction with it must be a solution of "alcoline, chloro-chromate, or a permanganate strengthened with sulphuric acid." The cathode was a copper or carbon electrode faced with a paste of "phosphoric acid, amorphous phosphorous, metallic copper in spangles, and cuprous chloride." This paste is to be mixed with hot sulfuric acid before applying to the electrode. The Government's expert testified in trial that he had no information as to whether the cathode, as placed in the battery, would, after having been mixed with the other chemicals prescribed, actually [\*48] contain cuprous chloride. Furthermore, respondents' expert testified, without contradiction, that he had attempted to assemble a battery made in accordance with Skrivanoff's teachings, but was met first with a fire when he sought to make the cathode, and then with an explosion when he attempted to assemble the complete battery.

#### IV.

##### *The Validity of the Patent.*

[\*\*\*LEdHR4] [4]The Government challenges the validity of the Adams patent on grounds of lack of novelty under 35 U.S. C. § 102 (a) (1964 ed.) as well as obviousness under 35 U.S. C. § 103 (1964 ed.). As we have seen in *Graham v. John Deere Co.*, *ante*, p. 1, novelty and nonobviousness -- as well as utility -- are separate tests of patentability and all must be satisfied in a valid patent.

The Government concludes that wet batteries comprising a zinc anode and silver chloride cathode are old in the art; and that the prior art shows that magnesium may be substituted for zinc and cuprous chloride for silver chloride. [\*713] Hence, it argues that the "combination of magnesium and cuprous chloride in the Adams battery was not patentable because it represented either no change or an insignificant change as compared to prior battery designs." And, despite "the fact that, wholly unexpectedly, the battery showed certain valuable operating advantages over other batteries [these advantages] would certainly not justify a patent on the essentially old formula."

[\*\*\*LEdHR5] [5]There are several basic errors in the Government's position. First, the fact that the Adams battery is water-activated sets his device apart from the prior art. It is true that Claims 1 and 10, *supra*, do not mention a water electrolyte, but, as we have noted, a stated object of the invention was to provide a battery rendered serviceable by the mere addition of water. While the claims of a [\*49] patent limit the invention, and specifications cannot be utilized to expand the patent monopoly, *Burns v. Meyer*, 100 U.S. 671, 672 (1880); *McCarty v. Lehigh Valley R. Co.*, 160 U.S. 110, 116 [\*\*\*579] (1895), it is fundamental that claims are to be construed in the light of the specifications and both are to be read with a view to ascertaining the invention, *Seymour v. Osborne*, 11 Wall. 516, 547 (1871); *Schriber-Schroth Co. v. Cleveland Trust Co.*, 311 U.S. 211 (1940); *Schering Corp. v. Gilbert*, 153 F.2d 428 (1946). Taken together with the stated object of disclosing a water-activated cell, the lack of reference to any electrolyte in Claims 1 and 10 indicates that water alone could be used. Furthermore, of the 11 claims in issue, three of the narrower ones include references to specific electrolyte solutions comprising water and certain salts. The obvious implication from the absence of any mention of an electrolyte -- a necessary element in any battery -- in the other eight claims reinforces this conclusion. It is evident that respondents' present reliance upon this feature was not the afterthought of an astute patent trial lawyer. In his first contact with the Government less than a month after the patent application was filed, Adams pointed out that "no acids, alkalines or any other liquid other than plain water is used in this cell. Water does not have to be distilled. . ." Letter to Charles F. Kettering (January 7, 1942), R., pp. 415, 416. Also see his letter to the Department of Commerce (March 28, 1942), R., p. 422. The findings, approved and adopted by the Court of Claims, also fully support this conclusion.

Nor is *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327 (1945), apposite here. There the patentee had developed a rapidly drying printing ink. All that was needed to produce such an ink was a solvent which evaporated quickly upon heating. Knowing that the boiling point of a solvent is an indication of its rate of [\*50] evaporation, the patentee merely made selections from a list of solvents and their boiling points. This was no more than "selecting the last piece to put into the last opening in a jig-saw puzzle." 325 U.S., at 335. Indeed, the Government's reliance upon *Sinclair & Carroll* points

383 U.S. 39, \*50; 86 S. Ct. 708, \*\*713;  
15 L. Ed. 2d 572, \*\*\*579; 1966 U.S. LEXIS 2754

up the fallacy of the underlying premise of its case. The solvent in *Sinclair & Carroll* had no functional relation to the printing ink involved. It served only as an inert carrier. The choice of solvent was dictated by known, required properties. Here, however, the Adams battery is shown to embrace elements having an interdependent functional relationship. It begs the question, and overlooks the holding of the Commissioner and the Court of Claims, to state merely that magnesium and cuprous chloride were individually known battery components. If such a combination is novel, the issue is whether bringing them together as taught by Adams was obvious in the light of the prior art.

[\*\*714] [\*\*\*LEdHR6] [6] [\*\*\*LEdHR7] [7] We believe that the Court of Claims was correct in concluding that the Adams battery is novel. Skrivanoff disclosed the use of magnesium in an electrolyte completely different from that used in Adams. As we have mentioned, it is even open to doubt whether cuprous chloride was a functional element in Skrivanoff. In view of the unchallenged testimony that the Skrivanoff formulation was both dangerous and inoperable, it seems anomalous to suggest that it is an anticipation of Adams. An inoperable invention or one which fails to achieve its intended [\*\*\*580] result does not negative novelty. *Smith v. Snow*, 294 U.S. 1, 17 (1935). That in 1880 Skrivanoff may have been able to convince a foreign patent examiner to issue a patent on his device has little significance in the light of the foregoing.

[\*\*\*LEdHR8] [8] Nor is the Government's contention that the electrodes of Adams were mere substitutions of pre-existing battery designs supported by the prior art. If the use of magnesium [\*51] for zinc and cuprous chloride for silver chloride were merely equivalent substitutions, it would follow that the resulting device -- Adams' -- would have equivalent operating characteristics. But it does not. The court below found, and the Government apparently admits, that the Adams battery "wholly unexpectedly" has shown "certain valuable operating advantages over other batteries" while those from which it is claimed to have been copied were long ago discarded. Moreover, most of the batteries relied upon by the Government were of a completely different type designed to give intermittent power and characterized by an absence of internal action when not in use. Some provided current at voltages which declined fairly proportionately with time.<sup>4</sup> Others were so-called standard cells which, though producing a constant

voltage, were of use principally for calibration or measurement purposes. Such cells cannot be used as sources of power.<sup>5</sup> For these reasons we find no equivalency.<sup>6</sup>

4 It is interesting to note in this connection that in testing the Adams cell the Signal Corps compared it with batteries of this type. The graphical results of the comparison are shown in respondents' brief, p. 51.

5 The standard text in the art states: "The best answer to the oft-repeated question: 'How much current can I draw from my standard cell?' is None." Vinal, Primary Batteries, p. 212 (New York 1950); see also Ruben U.S. Patent No. 1,920,151 (1933).

6 In their motion to dismiss the writ of certiorari as improvidently granted, respondents asserted that the Government was estopped to claim equivalency of cuprous chloride and silver chloride. We find no merit in this contention and, therefore, deny the motion.

[\*\*\*LEdHR9] [9] [\*\*\*LEdHR10] [10] We conclude the Adams battery was also nonobvious. As we have seen, the operating characteristics of the Adams battery have been shown to have been unexpected and to have far surpassed then-existing wet batteries. Despite the fact that each of the elements of the Adams battery was well known in the prior art, to combine [\*52] them as did Adams required that a person reasonably skilled in the prior art must ignore that (1) batteries which continued to operate on an open circuit and which heated in normal use were not practical; and (2) water-activated batteries were successful only when combined with electrolytes detrimental to the use of magnesium. These long-accepted factors, when taken together, would, we believe, deter any investigation into such a combination as is used by Adams. This is not to say that one who merely finds new uses for old inventions by shutting his eyes to their prior disadvantages thereby discovers a patentable innovation. We do say, however, that known disadvantages in old devices which would [\*\*715] naturally discourage the search for new inventions may be taken into account in determining obviousness.

[\*\*\*LEdHR11] [11] Nor are these the only factors bearing on the question of obviousness. We have seen that at the time Adams perfected his invention noted experts expressed disbelief in it. Several of the same

383 U.S. 39, \*52; 86 S. Ct. 708, \*\*715;  
15 L. Ed. 2d 572, \*\*\*LEdHR11; 1966 U.S. LEXIS 2754

experts subsequently [\*\*\*581] recognized the significance of the Adams invention, some even patenting improvements on the same system. Fischbach et al., U.S. Patent No. 2,636,060 (1953). Furthermore, in a crowded art replete with a century and a half of advancement, the Patent Office found not one reference to cite against the Adams application. Against the subsequently issued improvement patents to Fischbach, *supra*, and to Chubb, U.S. Reissue Patent No. 23,883 (1954), it found but three references prior to Adams -- none of which are relied upon by the Government.

We conclude that the Adams patent is valid. The judgment of the Court of Claims is affirmed.

*It is so ordered.*

MR. JUSTICE WHITE dissents.

MR. JUSTICE FORTAS took no part in the consideration or decision of this case.

#### REFERENCES

Annotation References:

Amendment of judgment as affecting time for taking or prosecuting appellate review proceedings. 97 L ed 255; 21 ALR 2d 285.

Computation of time for seeking review in United States Supreme Court. 87 L ed 257.

## RELATED PROCEEDINGS APPENDIX

None.